

GS2150 BATCH CONTROLLER.

OPERATING & INSTALLATION MANUAL.

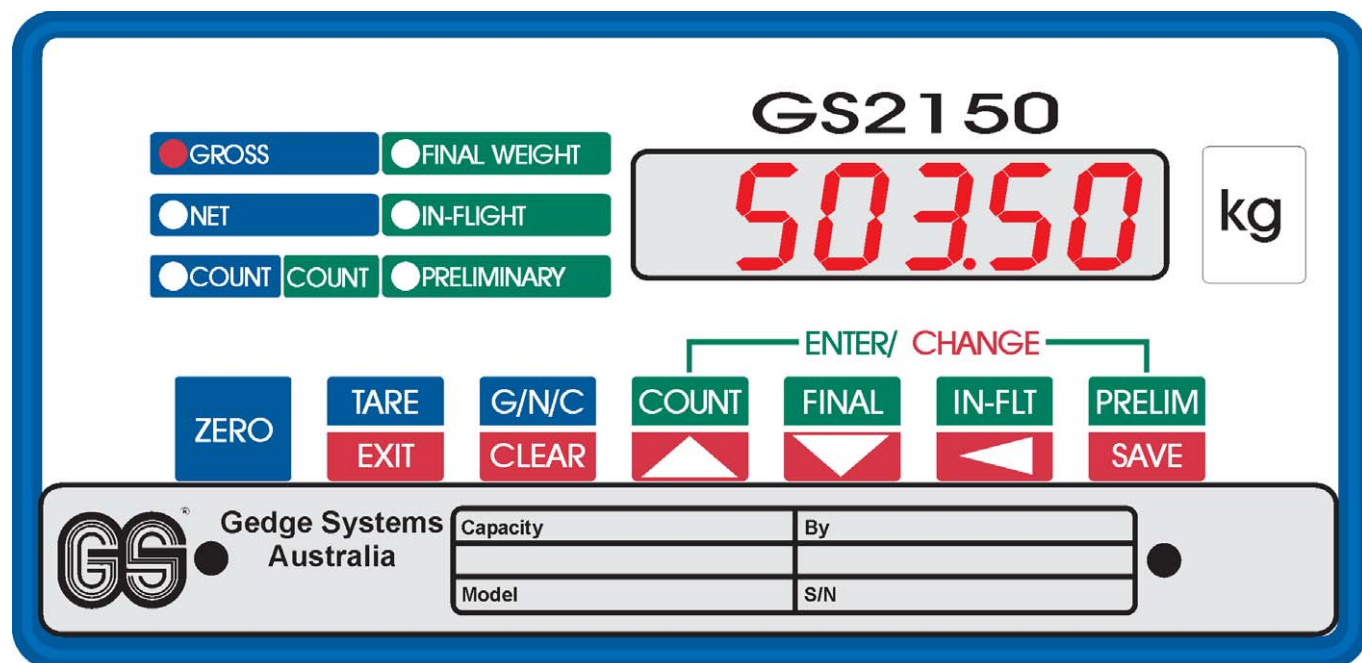


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ISSUE/VERSION NOTE- Zero Band Output can now be set on Gross OR Net weight.

This manual version 30042003 applies to GS2150s shipped after April 2003 which have Reverse Voltage Protection fitted to the OUTPUTS. There are no operation changes to the product.

This operating manual version "20041999i" applies to all GS2150 products fitted with software version "**dc0.7**". You can display the GS2150's software version by holding down the **G/N/C** key when power is applied.

The operating manual this version replaces, version "17121998" (some were marked "211196"), applied to the GS2150's earlier version software up to and including "**dc0.6**"

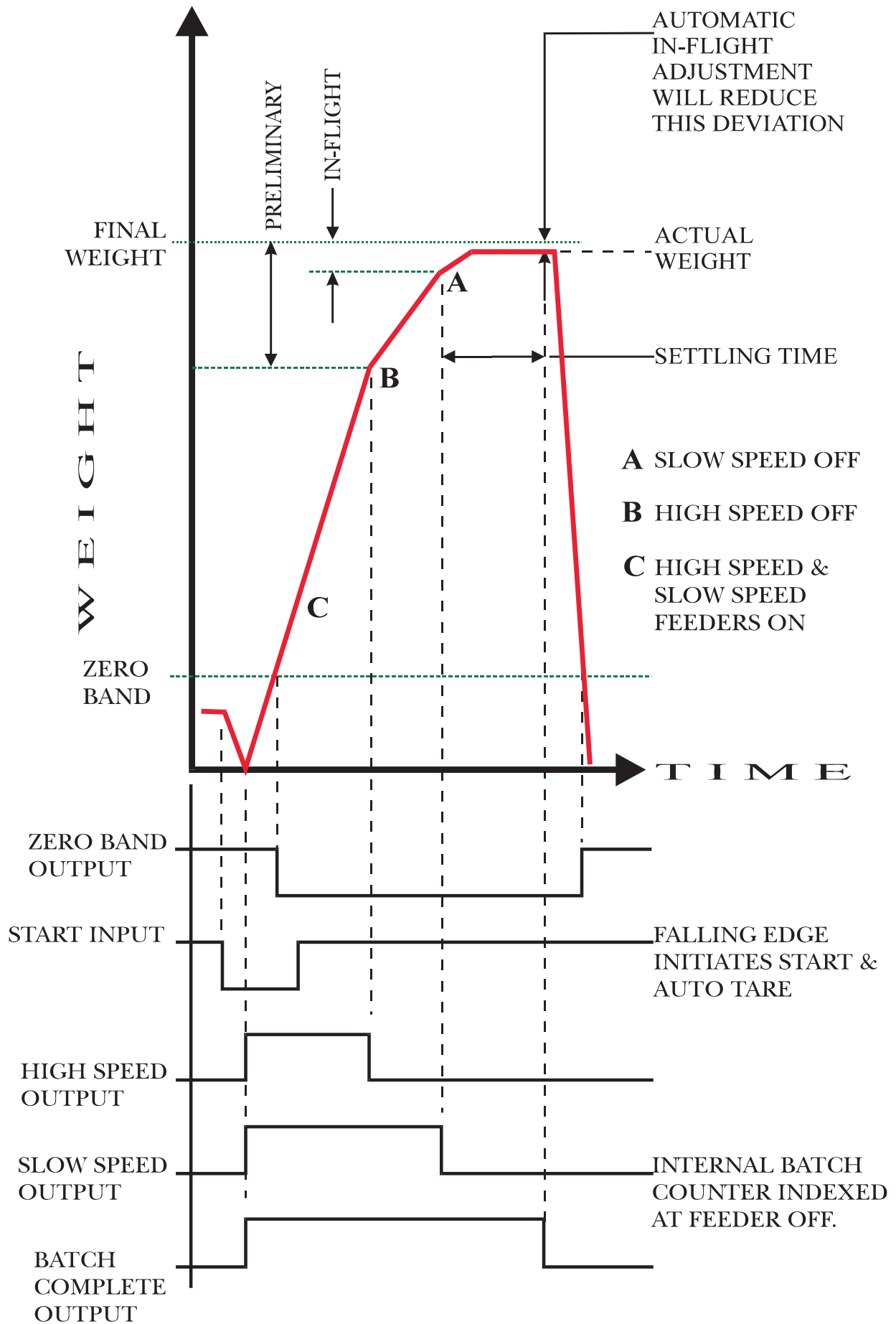
The **ONLY** difference between the software versions "**dc0.6**" and "**dc0.7**", and their manuals, is the way that the Zero Band output operates. On the earlier version GS2150 ("**dc0.6**"), the zero band output could be set to operate over the **GROSS** weight range 0 to 500 display divisions. It could not be set to operate on the **NET** weight.

The version "**dc0.7**" **CAN** be used to test either the **GROSS** or **NET** weight against the zero band setting. The digital setup now provides a range of settings for the zero band output from 0 to 80 display divisions with the test able to be made on **NET** weight or **GROSS** weight.

The new software is compatible with all "**dc0.6**" version GS2150 products, as the **ONLY** change is the zero band setting. The new software is compatible with products having software versions "**dc0.5**" to "**dc0.0**". **HOWEVER**, the entire installation and all of the setup settings and calibration settings will require careful review as there are extensive differences between version "**dc0.0**" and the now current version "**dc0.7**". *Contact the factory for cost and details regarding upgrades.*

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One of many possible GS2150 Batching Cycles

1 INTRODUCTION & FEATURES.

The GS2150 is a high performance microprocessor based single ingredient dual speed batch controller with 4 Control Inputs and 4 Control Outputs. The sensible size of the front of the GS2150 allows a keyboard and display that's easy to read and use. The short case length allows fitment into low cost small enclosures. The GS2150's wide range and flexible settings will ensure its profitable application in a large number of batching applications. Major features and benefits are:-

- Installs into small low cost enclosures - 150mm Body length and 180mm total depth with connectors allows installation into a standard 210mm depth enclosure.
- Operator friendly via the use of a colour coded layout with sensibly sized 17mm keys and a large 14mm display.
- Easy to use, the front panel lamps and descriptions are clear. The method of entering set weights and counts is natural and easy to remember.
- "Memorizes" batched weights and allows multiple "hold" and "continue" operations. The perfect solution for batching out when the material weigh hopper (or bag) must be "topped up" or replaced.
- Reliable with a design based on 15 years of weighing electronics equipment design. Complete "in-house" manufacturing and testing assure a long trouble free life.
- Low additional equipment costs. Powerful optically Isolated 0.5Amp 5VDC to 48VDC solid state outputs (current sinks) allow direct connection to feeder solenoids driven by a user supplied low cost power supply.
- Controls Dual Speed feeders via High Speed and Slow Speed Control Outputs.
- Fully automated batching using the Zero band Output and Batch Complete output avoids the need for discharge and cycle timers.
- High Accuracy Batching is assured by use of the GS2150's Automatic In-Flight Compensation adjustment feature.
- External batch Controls comprise FOUR Optically Isolated Control Inputs for KEYBOARD LOCKOUT, Acquire TARE, START and STOP batch. Control inputs are programmable to a range of uses.
- Drift free gross display at zero guaranteed. Includes automatic Zero maintenance using adjustable Zero Track and Motion feature.
- Optional 9 digit Totals Accumulator to totalize batched weight and the number of batches.
- Not a Panel meter. The GS2150 is a proper full function weight indicator. It is designed and manufactured by Gedge Systems who has international weights and measures approvals for weight indicators and controllers.
- Display any weight to 199990. The wide ranging display of 6 digits allows virtually any weight to be displayed. weight settings include adjustable display resolution from 400 to 10,000 divisions in 100 division steps, adjustable "count by" settings of 1, 2, 5, 10, 20 and 50 with adjustable decimal point-all setup via the keyboard.
- Easy to calibrate. No internal potentiometers or setup switches within the GS2150. Calibration is automatic via the front panel keyboard using easy to follow steps.
- Reduced operator fatigue via a steady weight display obtained through individually adjustable settings for display update rate and "feeder control" comparator rate. Allows very fast feeding and control for the highest accuracy while maintaining a steady and easy to watch display.
- Super fast and accurate cutoff. The 800 weight comparisons per second via Linear Predictive Modelling provide ultra fast control for the "ultimate" in high speed batching. The GS2150 also includes a fast 44 per second "non predictive" comparison rate.
- Reduced ancillary equipment costs. The GS2150 includes a versatile batch counter which can count up or count down and is preset via the keyboard.
- No pause batching, all weight and batch count settings are entered into the GS2150 without the need to stop the batching process.
- Fewer false service calls resulting from wrong settings. All settings entered into the GS2150 are automatically checked and not accepted if they are wrong.
- Easy connections via 100% "plug and socket" connections. Convenient removable screw terminals for control signals, a shielded 9 pin connector for load cells to minimize interference and a plug connected mains power cable.
- Quality Assured via extensive performance verification prior to shipment.

2 QUICK INSTALLATION & CONNECTIONS.

This section contains all of the GS2150's connections and settings. To avoid duplication, much of the material in this section does not appear elsewhere in the manual. Therefore, all personnel installing the GS2150 will need to refer to this section. Those familiar with the GS2150 may only need to refer to this section of the manual with occasional reference to the more detailed sections. Other personnel should read the manual completely.

2.1 Connecting to the Mains Supply.

The GS2150 may be connected to the local power supply directly or through an isolation switch, but always in compliance with the local electricity authority's codes of practice. In any event, the means must be made available to remove power from the GS2150 during service.

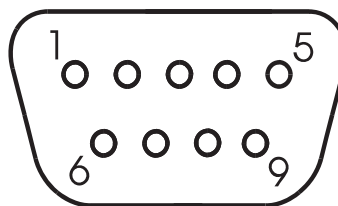
WARNING - Check the rear panel of the GS2150 for the mains voltage required before connecting the GS2150 to the local power supply.

2.2 Connecting Load Cells.

Load cell connection to the GS2150 is via a rear mounted 9 pin D male connector. A mating female cable connector is provided. A high quality load cell cable with a braided shield having twisted conductors must be used to minimise interference. All cable extensions, including junction boxes, must provide shield continuity. The table and connector drawing below shows the load cell connections.

GS2150's LOAD CELL CONNECTOR.	
Pin Number	Connection
3	Positive Excitation. (+ Exc.)
4	Negative Excitation. (-Exc.)
5	Positive Sense.
8	Negative Sense.
2	Positive load cell Signal. (+ Sig.)
1	Negative load cell Signal. (-Sig.)
6 and 9	GS2150 Frame. (Cable Shield)
7	Ground. {Normally no connection.}

The shield **MUST** be connected to the back shell by crimping it between the two shells, ensuring there is no gap between the shells, **AND** it **MUST** also be connected to pin 6 or 9 of the load cell connector.



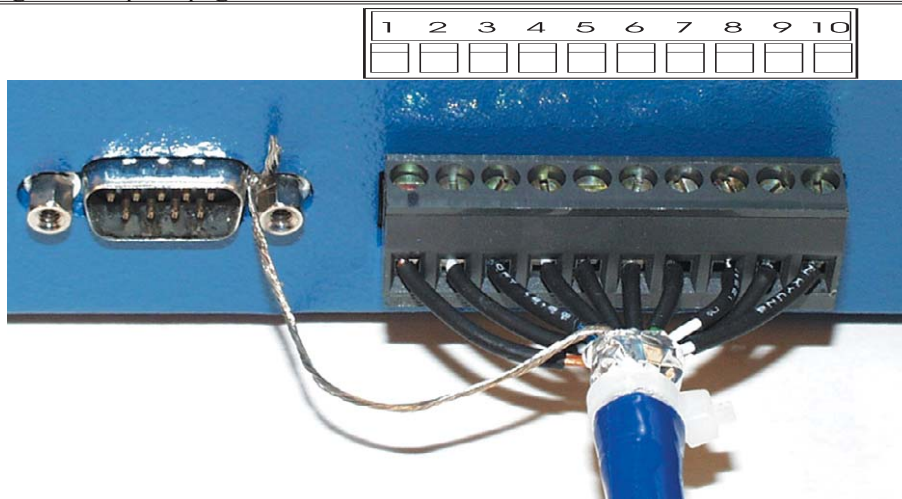
GS2150's Load Cell Connector viewed from the Cable side.

2.3 Connecting Control Inputs and Outputs.

Control inputs and outputs are connected to the GS2150 via a plug and socket 10 way screw terminal. To ensure that the GS2150 installation does not interfere with other equipment, and that other equipment does not interfere with the GS2150, the control cable must comply with the general requirements of Tech Note TN-1021 "Shielding - Cables and Connectors". This Tech Note is included with the documentation shipped with the GS2150. For your convenience, the GS2150 uses a screw terminal for its inputs and outputs, rather than a plug and socket connection as described in the tech note. Nevertheless, shielding is important. The photograph below shows how the cable shield is to be connected to the body of the GS2150. This is achieved by removing the jack screw on the load cell connector and wrapping the shield drain wire once around the threaded portion of the screw. The jack screw is then firmly screwed into place to provide the earth connection for the cable. The table immediately below identifies each of the GS2150s control inputs and outputs.

GS2150's CONTROL INPUT/OUTPUT CONNECTOR.		
Terminal Number	Description	Required external circuit condition. (also see drawings on the following pages)
1	LOCK Input - keyboard lock.	Closed circuit to lock the keyboard, open circuit or no connection to unlock the keyboard.
2	TARE/HOLD Input.#.	Normally open circuit. The falling edge of a momentary closure (short circuit) acquires a tare or acts as a hold input.
3	START/CONTINUE Input.#.	Normally open circuit. The falling edge of a momentary closure (short circuit) provides a start or continue signal for the GS2150.
4	STOP/RESET Input.#.	Normally open circuit. The falling edge of a momentary closure (short circuit) provides a stop or reset signal for the GS2150.
5	+5VDC to +24VDC User's power supply.	
6	User's power supply ground.	
7	HIGH SPEED FEEDER Output.	Output is On to feed material at high speed.
8	SLOW SPEED FEEDER Output.	Output is On to feed material at slow speed.
9	ZERO BAND Output#..	Output is On for selected gross or net weight within the zero band.
10	BATCH COMPLETE Output.#.	Output goes On when Slow Speed feeder is turned on and off after time-out following Slow Speed feeder going off. Only functional if batch control parameter is on.

The operation of these inputs and outputs depends upon the way the GS2150 is setup during installation. See Digital Setup on page 24 for further details.



The drawing shows the numbering used for the screw terminal as it does not have any numbers printed upon it.

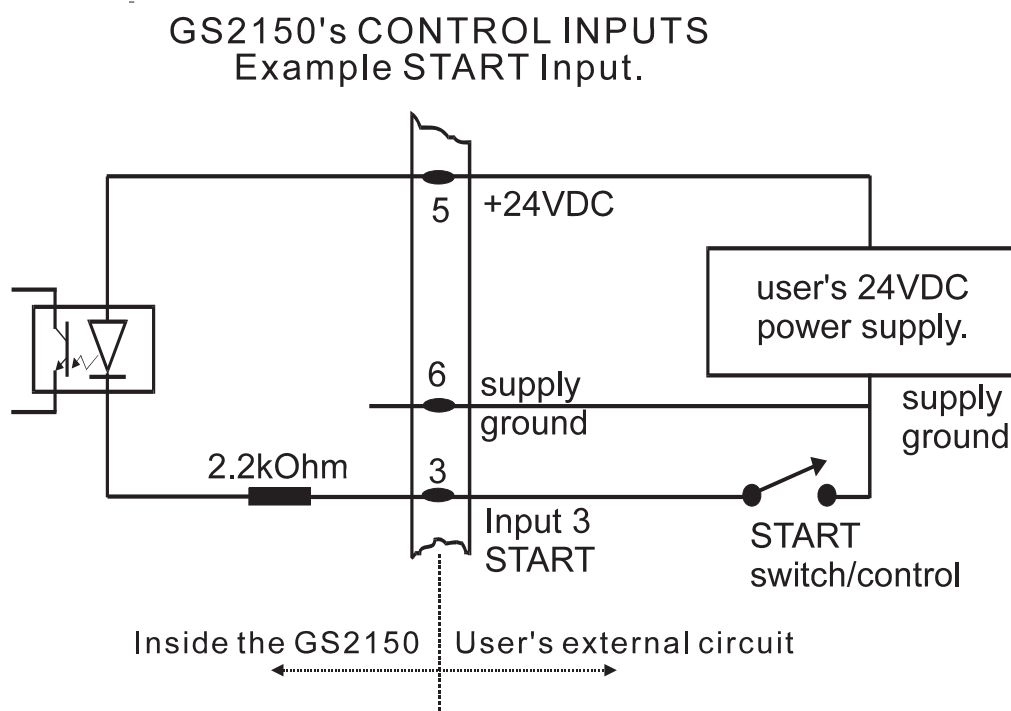
2.4 Electrical Specification of the GS2150's Inputs.

The GS2150's 4 optically isolated inputs each have an internal current limiting 2.2k Ohm resistor. The inputs are suitable for connection to switches, relay contacts, Opto coupler outputs, PLCs and other logic devices.

Inputs are **ON** when the user's external device is closed shorting the external power supply low through the user's device to the GS2150's Input connection. Inputs are **OFF** when the user's device is open circuit or there is no connection to the GS2150.

The user's external 5VDC to 24V DC power supply HIGH is to be connected to the + 24VDC input terminal 5 of the GS2150's Input Connector. The power supply ground of the user's external supply is connected to each of the GS2150's input terminals 1 to 4 through the user's devices.

No connection is required in applications where a particular input is not used. For example, no connection is needed to Input number 1 "Key Lock" if the key lock feature is not required.



Example of the GS2150's Control Inputs - START Input

WARNING - Take care when connecting the remote 24VDC supply. Make certain that the GROUND is connected to pin 6 and the +24VDC to pin 5. Reversing this connection will cause damage.

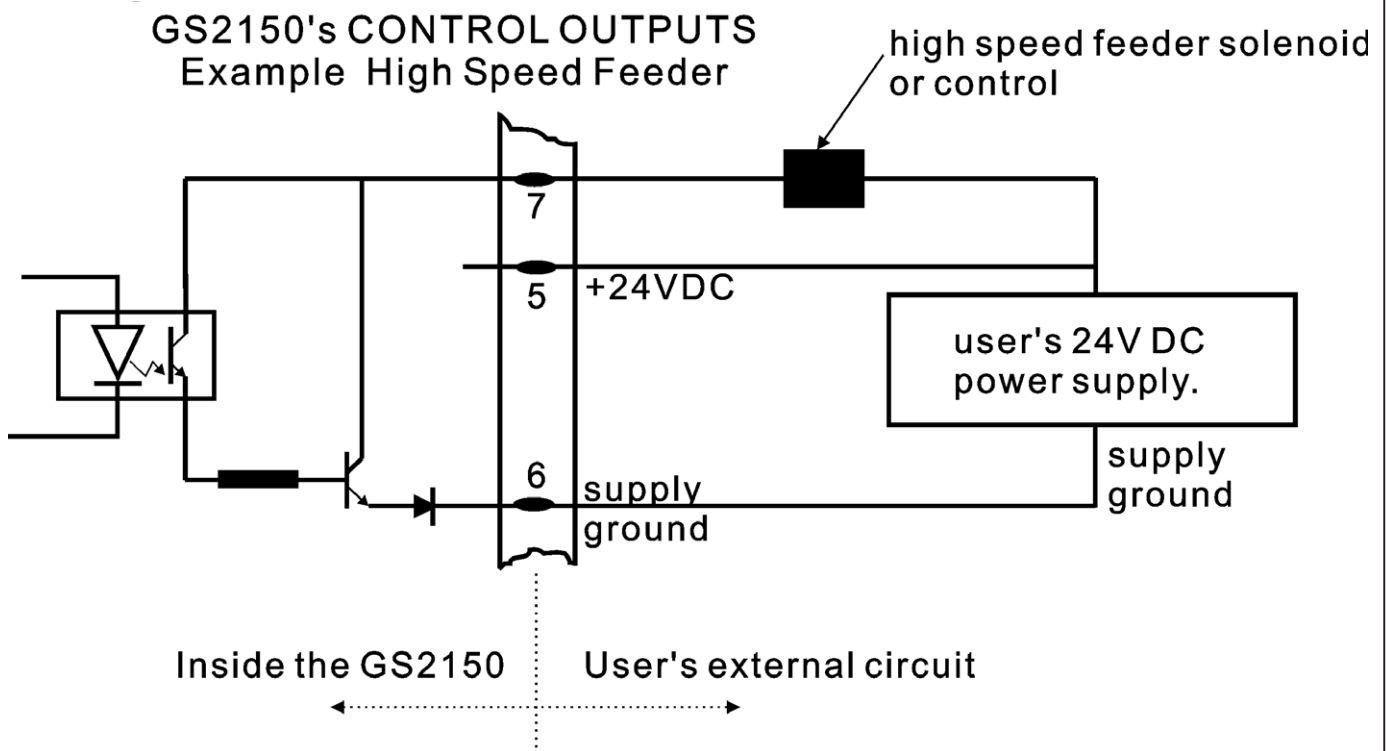
2.5 Electrical Specification of the GS2150's Outputs.

The GS2150's 4 optically isolated outputs are open collector solid state devices capable of sinking a maximum of 0.5Amp at 5VDC to 45VDC.

The outputs are suitable for connection to the user's logic or control supply for TTL/CMOS devices such as Opto-22 solid state relays, Opto couplers, solenoid operated relays and control solenoids drawing less than 0.5Amp coil current with reverse bias diode protection across the coil. (For details of protection circuits see following page).

The GS2150's outputs are ON when the GS2150's internal controls are sinking current to the users's supply ground terminal 6 through the user's output devices connected to terminals 7 to 10. The GS2150's outputs are OFF when the GS2150's internal controls are open circuit.

The user's external power supply ground is to be connected to the GS2150's common output ground terminal 6 and the power supply 5VDC to 24VDC high to each of the GS2150's output terminals 7 to 10 through the user's device.



Example of the GS2150's Control Outputs Showing Reverse Voltage Protection - HIGH SPEED Feeder

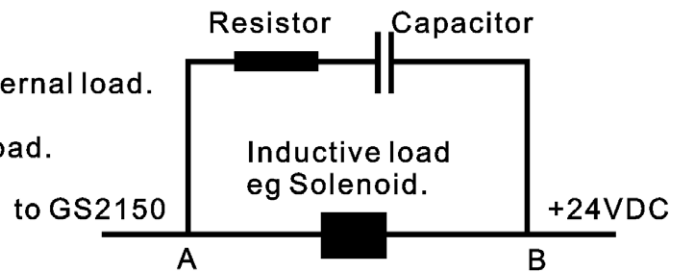
NOTE:- GS2150 Products shipped after April 2003 are fitted with diodes on the **OUTPUTS** to prevent damage to the output circuit if the supply voltage is connected incorrectly - (reversed). If the **OUTPUTS** do not appear to operate it may be due to an incorrect connection - before calling for assistance double check the terminations to ensure they are as shown in the Figure above for **OUTPUTS** and the Figure on the preceding page for **INPUTS**.

2.6 Transient Suppression.

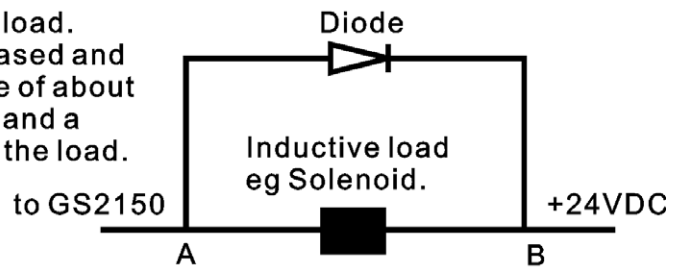
When the GS2150's outputs are used to switch loads which are not purely resistive, including relay and solenoid coils, an external snubber circuit must be used. Failure to use a suitable snubber circuit will adversely affect the operation of the GS2150. The drawing below shows two types of snubber circuits - a Resistor/Capacitor arrangement and a reverse biased Diode. In both cases, the snubber components must be fitted as close to the solenoid (inductive load) as possible in order to be effective. Of the two circuits, the RC network will generally provide the best result.

GS2150's CONTROL OUTPUTS showing Spike Supression

RC network across the external load.
C 0.10 to 1.0 microfarad.
R resistance same as the load.

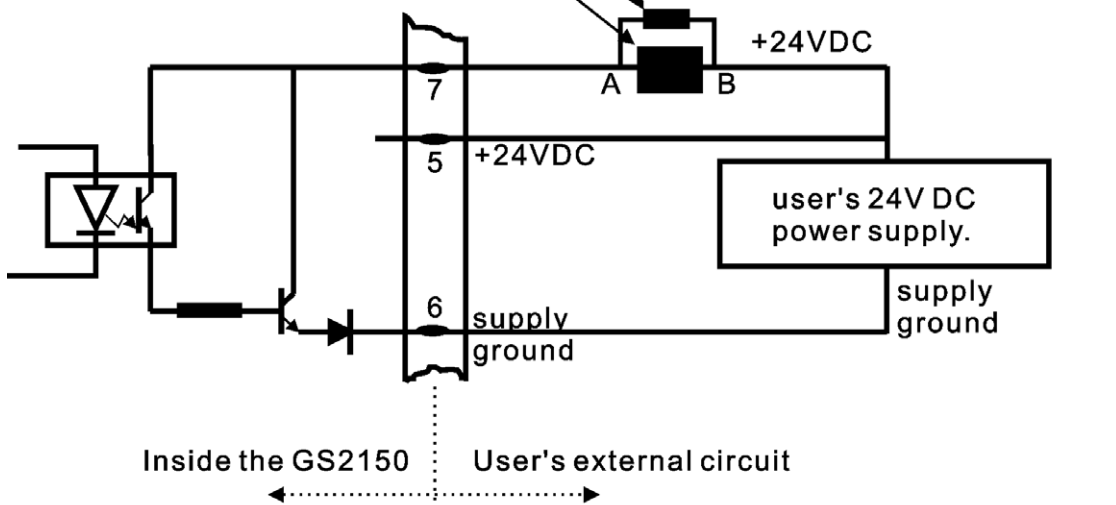


DIODE across the external load.
Diode should be reverse biased and
have a peak inverse voltage of about
10 times the circuit voltage and a
forward current larger than the load.



spike suppression close to and across
the external inductive load.
See examples above

high speed feeder solenoid
or control



Transient Suppression for Inductive Loads.

2.7 Digital Setup

The Digital Setup selections should be programmed before weight calibration. The setup settings are accessed in order of settings most frequently changed to settings least frequently changed. The table below briefly identifies each setting together with a recommendation. Digital setup on page 24 should be read for full details.

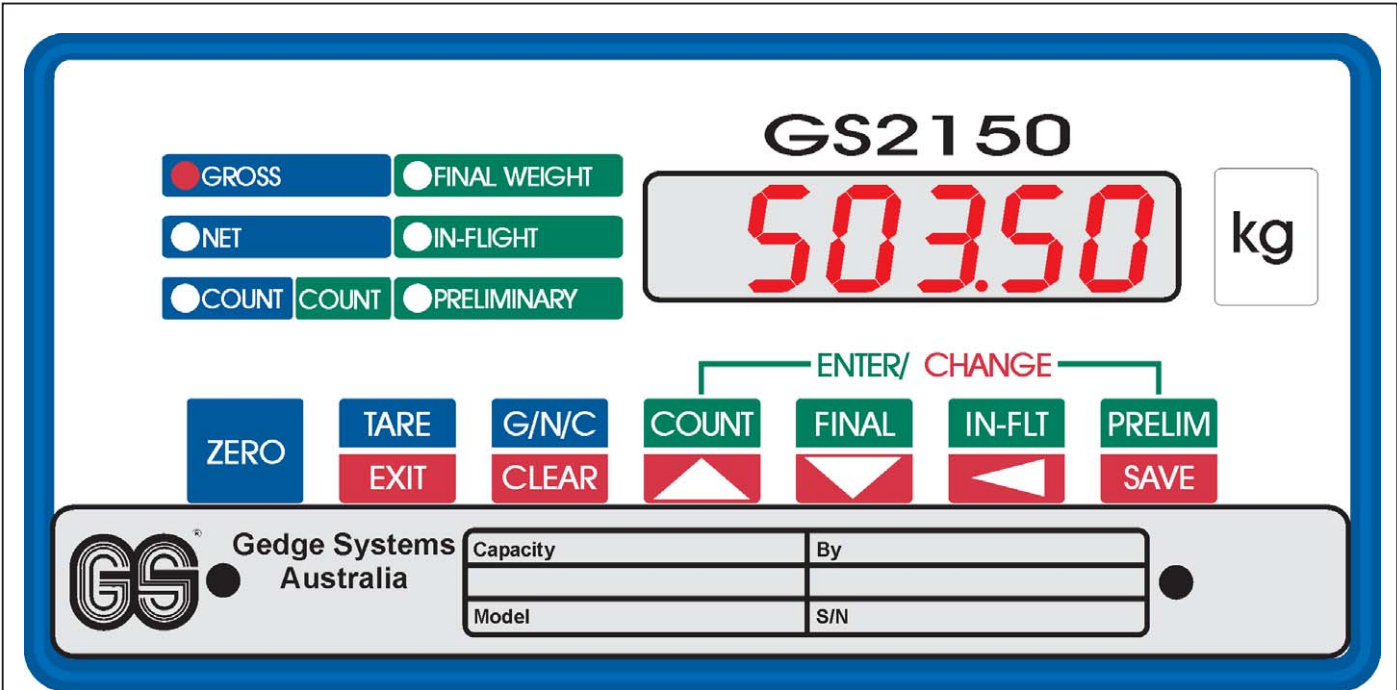
To program settings key **CAL** to display the settings then **CAL** again to display each setting. Key **UP** or **DOWN** and **LEFT** to change the settings. Key **END CAL** to save the changes.

Digital Setup Parameters	
Suggested Settings.	Comments
ob.g 2	zero band - this setting, in display divisions for the selected gross or net weight, operates the zero band output. The output is on whenever the gross/net weight is within the zero band. The value will depend upon the application.
ot3 - 2	zero tracking - automatic gross zero maintenance. The left hand value is the zero track band. The right hand value is the motion limit in display divisions per second. Start with a zero track band of 3 and a motion limit of 2 divisions per second. This setting should be off during weight calibration.
AIF.16.2	Automatic In-Flight adjustment. The left hand value is the band within which automatic adjustments are made. The right hand value is the settling time in seconds. If set to OFF the batch complete output is turned on 1 second after Slow Speed feeder cutoff. Otherwise the time setting of 1, 2 or 4 seconds is used for the batch complete signal. Make the initial setting 16 display divisions and 2 seconds and tune the installation trying different settings.
HY 2d	Hysteresis - this setting has no effect if the batch control setting is on (bc On or bc On.At). Otherwise this setting programs the feeder control “dead band”. The setting will depend upon the application.
dr 2	display rate - select a rate divider to provide a steady display. Start with 2.
cr 1	comparator rate - the rate at which the GS2150 compares set weights to actual weights. Start with 1 and increase it to 2, 4 etc if feeders are not steady.
LP OFF	Linear predictive modelling - start with linear prediction OFF .
rAngE1	range - load cell millivolt input range. Start with range 1. If greater speed required try 2 and 3. (Full load input for each range is:- 1 30mV, 2 20mV and 3 10mV)
d 10000	display divisions - select the required number for the weight to be displayed.
dP0.00	decimal places - select the required number for the weight to be displayed.
Cb 1	count by - select the required number for the weight to be displayed.
bt.In n	batching type - select the required batching method depending upon the application. Batching by net weight is required for the “hold/continue” feature.
nd.n L1	normal display and key locking scheme - selects the display the GS2150 should show most of the time and the keyboard locking scheme used when the remote key lock input is “locked”. The selection will depend upon the application.
count3	batch counter - select the method of operation for the batch counter. The selection will depend upon the application. Count4 disables the counter.
bc On.At	batch control - select batch control “ On ” if the GS2150 is to latch the outputs. Select “ On.At ” if the GS2150 is to acquire a tare at the beginning of the batch and to enable the “hold/continue” feature.

2.8 Weight Calibration

ZERO - With only the empty weight of the hopper on the load cells key **CAL** then **ZERO** to obtain a zero gross weight display. **SPAN** - Load the hopper with the required calibration weight. Key **CAL** then **SPAN**. The full scale capacity will be displayed for 5 seconds. Check that this is the total weight capacity of the installation. If incorrect key **END CAL** and check the Digital Setup settings. If the full scale capacity is correct, when **000000** is displayed, use the keys **UP**, **DOWN** and **LEFT** to enter the required weight, then key **SPAN**.

If zero, or the calibrated weight, cannot be obtained, carefully review the installation as well as the detailed calibration and setup instructions contained in this manual.



3 OPERATING THE GS2150

3.1 Applying Power

When power is applied the GS2150 loads its internal settings, verifies its software program, and checks the state of the Optional **BR1** battery backed ram and Totals Accumulators (if fitted). If no faults are found the GS2150 will display either the Gross Weight, the Net Weight or the number of Batches (Counts).

The information displayed and the state of the GS2150's control outputs will depend on how the GS2150 was programmed during installation.

The GS2150 will identify any installed options, together with the software version and issue number, if the "G/N/C" key is held down when the power is turned on. These details are followed by a display segment check. The displayed messages are:-

- Std- Standard. No options are installed.
- br1- Option BR1 battery backed RAM is installed.
- br1.t- Option TOTALS/BR1 totals accumulator and battery backed RAM is installed.

dc0.3 Product designation and software version/issue number.

88888 Display segment check.

3.2 Messages

The GS2150 displays the following messages as warnings or to advise of faults:-

-Locd- The entire keyboard or the particular key is locked via the GS2150's key lock input.

Hold Is displayed for 2 seconds after operation of the remote "HOLD" input. The weight of material batched is "memorized". The GS2150 continues batching where "it left off" when "CONTINUE" is operated.

Cont Is displayed following operation of the "CONTINUE" input if the GS2150 has "memorized" the weight of material batched so far. ("CONTINUE" has been operated after the batch was paused using "HOLD"). The "CONTINUE" input will cause the GS2150 to resume batching; the "STOP" input will reset the batch clearing the accumulated batched weight; all other keys are ignored with the GS2150 blanking the display briefly to signify proper operation.

-HI- The entered weight setting exceeds the GS2150's installed capacity. Use the revised weight now displayed if the maximum weight available is required.

-LO- The entered weight is lower than the minimum allowed. Use the revised weight now displayed if the minimum weight available is required.

—— The load on the weigher exceeds 120% of the GS2150's installed capacity.

OFF The load on the weigher exceeds the GS2150's load cell input capacity.

-OFF The load on the weigher is below the GS2150's load cell input capacity.

Prg.Err The GS2150's program has developed a fault. Contact the factory.

ErrA A calculation error has occurred. Check the weight and count settings. Contact the factory if this persists.

Err.o Overflow Error. This error, which is very unlikely, only occurs if the current batched weight, when added to the totals accumulator, results in a total which exceeds 9 digits (999,999,999). The GS2150 halts batching with this message displayed until any front panel key (which is not "locked out") is operated. Following the key, the GS2150 resumes normal operation. The batch just completed could NOT be added to the accumulated totals. The accumulated totals should immediately be displayed, noted and cleared BEFORE any further batches are produced.

Err3 The battery supporting the GS2150's option **BR1** memory chip may have failed. The GS2150 has reset the batch counter, the "hold" batched weights, the stored tare and the accumulated Zero Track value to zero. Allow several minutes to pass then remove power for 1 minute. If the error message re-appears contact the factory. Batching can continue with this fault. HOWEVER, the batch count, stored Tare, "held" weights and accumulated Zero Track values will be lost on power failure.

Err.t This fault message usually ONLY occurs following the **Err3** message described above. A fault has occurred with the accumulated total weights and batch counts. The information cannot be retrieved. The GS2150 will display this message until any front panel key (which is not "locked out") is operated. The totals memory will then be cleared. Before batching again allow several minutes to pass then remove power for 1 minute. If the error message re-appears contact the factory. Batching can continue with this fault. HOWEVER, the accumulated totals may be in error.

total The optional TOTALS for batched weight and batch counts can be displayed. Keying FINAL displays the weight total and keying COUNT displays the batched count total. See page 16 for a description of how to display and clear batch totals.

3.3 Front Panel Lamps

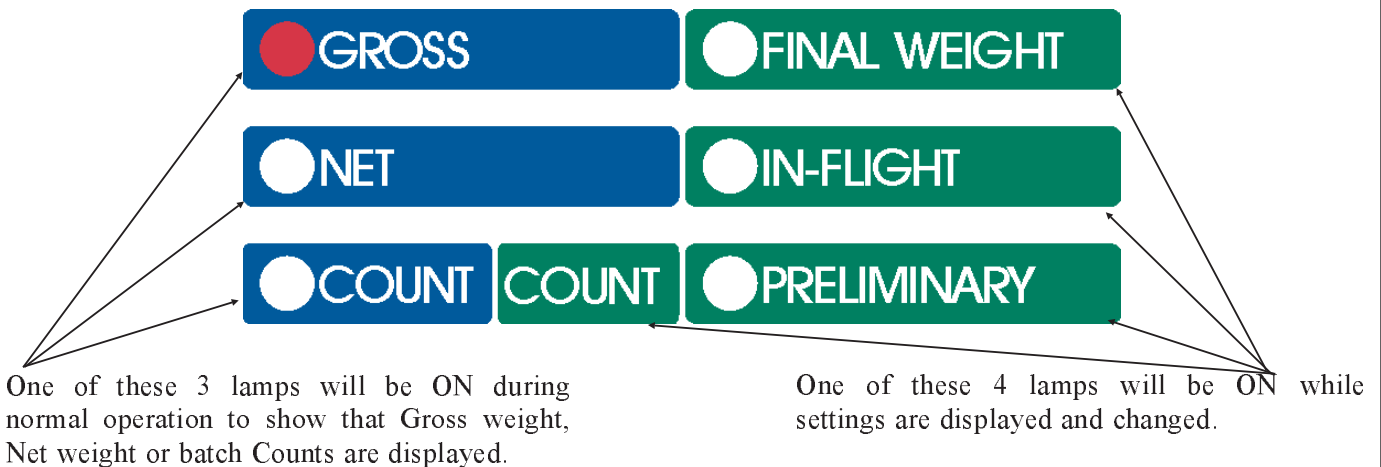
The GS2150's front panel contains two groups of colour coded lamps.

The GROSS, NET and COUNT lamps within the blue border identify the information that the GS2150 displays most of the time during normal weighing and batching.

When settings are being programmed, the FINAL WEIGHT, IN-FLIGHT, PRELIMINARY and COUNT lamps within the green border identify the setting displayed.

In addition, the FINAL WEIGHT and PRELIMINARY lamps will be ON whenever the slow speed feeder (FINAL WEIGHT) and high speed feeder (PRELIMINARY) are ON. As a further aid to the operation of the GS2150 the Gross, Net or Count lamp can be programmed to flash whenever the weigher is in motion, typically during material feeding.

When the GS2150 is fitted with the optional TOTALS accumulator, the FINAL WEIGHT and COUNT lamps are used to identify the displayed weight or batch count total. See page 16 for a description of how to display and clear batch totals.



The lamp will flash if the weigher is in motion (feeding material) and zero tracking is on. {Depending upon the way the GS2150 was installed}.

The GS2150 will automatically return the display to a weight or count setting if no keys are pressed after any interval of 15 seconds while programming a setting.

When the optional TOTALS are displayed, the FINAL WEIGHT lamp will be on for the weight total and the COUNT lamp will be on for the batch counts total. **The GS2150 does not automatically exit the totals display mode after 15 seconds of key inactivity.** In addition, totals cannot be displayed while batching and batching cannot be started while displaying totals.

3.4 Normal Keyboard Controls

The GS2150's keyboard contains 7 keys as described in the following. Three of the keys are used during normal weighing and batching. They ZERO the gross weight, acquire a TARE value and select Gross, Net or batch Counts to be displayed. The other four keys, together with dual functions on two of the weighing keys, are used to program weight and count settings. If the GS2150's TOTALS option is installed, these keys are also used to display and clear the accumulated totals. See page 16 for a description of how to display and clear batch totals.

The Three keys used during normal Weighing and Batching.

The normal weighing keys are coloured blue. Their functions are described below. If the message “**-Locd-**” appears when a key is operated the GS2150's external key lock input is ON and the key cannot be used. When the optional TOTALS are “locked out” the “**-Locd-**” message does not appear. Instead, the totals are just not displayed.

ZERO

This key ONLY operates if the GS2150 is displaying GROSS weight AND the total weight to be “zeroed” out is less than 4% of the weighing capacity. The GS2150's display blanks briefly when a new zero is acquired. (The 4% limit to the total weight which may be “zeroed” includes the currently displayed gross weight PLUS any weight “zeroed out” by previous ZERO key and ZERO



TARE

This key operates when GROSS weight, NET weight or COUNTS are displayed. It also operates if the weigher is in motion (while batching).

On operation of the TARE key the present gross weight is acquired as a tare value, the resulting NET weight will be zero. The GS2150 switches the display to NET weight on operation of the TARE key except when batch COUNTS are displayed.

G/N/C

This key operates all the time the GS2150 is in the normal weighing and batching mode. Operation of the G/N/C key displays GROSS weight, NET weight and batch COUNTS and, if the optional TOTALS are installed, displays the message ‘**total**’ allowing the weight or count totals to be displayed.

The GS2150 maintains the selected display until changed with the G/N/C key or until power failure when the display default selection of Gross, Net or Counts will be displayed.

Counts will not be displayed if batch counting has been turned off during installation of the GS2150.

The message ‘**total**’ will not be displayed unless the TOTALS option is fitted, the GS2150 is not batching and the remote key lock is “unlocked”.

The Six keys used to Program Weight and Count settings.

Six of the GS2150's keys have dual functions and are used to display and program weight and batch count settings. When the GS2150's TOTALS option is installed, these keys are also used to display and clear the accumulated batched weight and count totals. See page 16 for a description of how to display and clear batch totals. To separate these keys from the weighing keys they are coloured differently.

The settings keys are coloured red and green whereas the weighing keys are coloured blue.

The green keys are used to select the setting to be changed and the red keys are used to make the changes, to save the changed values and to return the GS2150's display to the normal weighing and batching mode. If the message “-*Locd*-” appears when a key is operated the GS2150's external key lock input is ON and the key cannot be used.

The GS2150's batch counter can be disabled during installation. This prevents counts from being displayed. The GS2150 can continue batching while weight and count settings are being changed. HOWEVER, caution should be used in changing any settings while batching is in progress.

COUNT, FINAL, IN-FLT, PRELIM

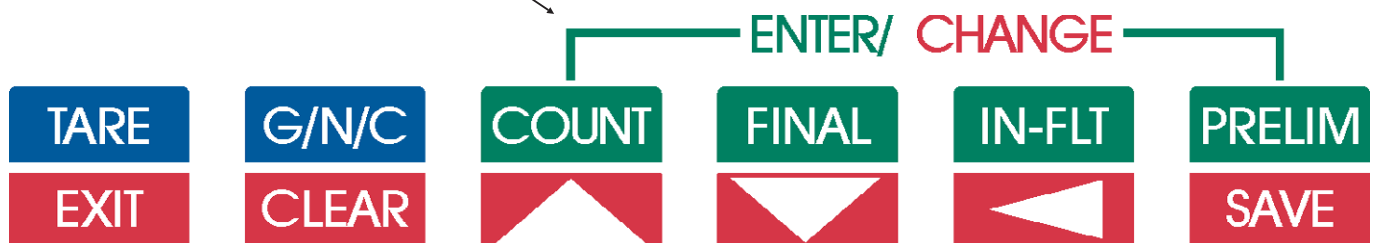
Keying any of these green keys while the GS2150 is in the normal weighing and batching mode will display the selected setting. As soon as the setting is displayed the digit on the right flashes to indicate that the setting may be changed by use of the RED change keys. Counts are not displayed if batch counting was turned off during installation of the GS2150. The information displayed for each of the green keys is:-

COUNT - The presettable batch counter.

FINAL - the final or target weight for the batch.

IN-FLT - the in flight cutoff setting which turns the slow speed feeder off at Final Weight minus In Flight.

PRELIM - the preliminary cutoff setting which turns the fast feeder off at Final weight minus Preliminary.



EXIT, CLEAR, UP, DOWN, LEFT, SAVE

Keying any of these red change keys AFTER selecting a setting to be edited will change, clear or save the setting. The operation of each red key is:-

EXIT - returns the GS2150 to the normal weighing and batching mode WITHOUT saving any of the changes made to the setting.

CLEAR - clears the setting to zero.

UP and **DOWN** arrows - used to change the setting by rolling the digit which is presently flashing.

LEFT arrow - selects the digit to be changed by operation of the UP and DOWN arrow keys.

SAVE - saves the edited setting blanking the display briefly. The GS2150 checks the value of each setting prior to saving it. If the setting value means that the GS2150 could not operate correctly, the GS2150 will not accept the setting. Instead, the GS2150 will display a message followed by the correct largest or smallest setting available. (see page 17 for a description of the available settings values.)

3 .5 Keyboard Controls for optional TOTALS.

The GS2150's optional batched weight and counts accumulated totals are displayed and cleared using the GS2150's front panel keyboard.

How the totals are displayed:

The GS2150 accumulates totals to NINE digits. This can result in a number as large as 999,999,999 having to be displayed on the GS2150's six digit display. This is achieved as follows-

The GS2150 identifies the beginning and end of the NINE digit number by a half bracket character.

When the GS2150 first displays the selected total, it displays the FIVE or SIX least significant digits if the accumulated total is six digits or less (that is, if the entire number will fit within the six digit display). If instead, the accumulated total is greater than six digits, the GS2150 will initially display the SIX most significant digits. For example, if the accumulated total weight was eight digits, 09458321.4 the GS2150 will initially display the six most significant being "945832". The remaining digits can still be displayed, see below.

The LEFT key (IN-FLT) is used to scroll (move) the displayed total left and right. When the total is first displayed, if the total exceeded six digits, the LEFT key will move the total to the left until digit 1 followed by the end half bracket is displayed. At this point the entire active part of the accumulated total will have been displayed. Keying LEFT again moves the displayed total right until the beginning half bracket in front of digit 9 is displayed. If the total was less than six digit, keying LEFT will initially move the displayed total to the right (instead of to the left).

How to DISPLAY the accumulated totals:

Key **G/N/C** until the message "**totAL**" is displayed. This message will only be displayed if the GS2150 is not batching, (that is both feeders are off), AND the remote key lock input is "unlocked".

When the message "**totAL**" is displayed or when the batch totals are displayed the keys **ZERO** and **PRELIM** are ignored by the GS2150. A batch **START** input is also ignored.

To display accumulated batch counts key **COUNT**. To display accumulated batch weight key **FINAL**. The selected accumulated total will be displayed. The lamps **COUNT** or **FINAL WEIGHT** will illuminate to identify the total displayed.

To display the batched count total while the accumulated weight total is displayed first key **COUNT** to display the message "**totAL**" and then key **COUNT** again to display the accumulated total batch counts.

To display the batched weight total while the accumulated counts total is displayed first key **FINAL** to display the message "**totAL**" and then key **FINAL** again to display the accumulated total batch weight.

To exit and resume normal operation key **EXIT**.

How to CLEAR the accumulated totals:

Select the count or weight total to be cleared (as described above).

Key **CLEAR (G/N/C-CLEAR)**. The GS2150 will display the message "**SurE**". Keying **EXIT** displays "**totAL**" without clearing the total. Keying **CLEAR** zeros the accumulated total - the zeroed total is then re-displayed. **WARNING** - there is no recovery from keying **CLEAR** after the warning message "**SurE**". Make certain that the accumulated total has been noted before it is cleared. The counts and weight totals are cleared separately. It is a good idea to clear them both at the same time.

3 .6 Limits to Weight Settings

The GS2150 checks all weight settings as they are entered to ensure proper operation.

For the GS2150 to be able to operate its feeder control outputs some settings **MUST** be larger than others, and some other settings **MUST** be larger than a particular value but smaller than another value.

As an example, the IN-FLIGHT setting **CANNOT** be the same or larger than the FINAL weight setting. If it is, the feeder will never turn on!

In addition to ensuring that the value of the weight setting being programmed allows proper operation, the GS2150 also ensures that the increments of any weight value match the GS2150's installed setup. This is done by automatically limiting the smallest weight value change to the "count by" value set during installation.

As an example, if the GS2150 is installed to display weight in 5gm increments, then 5gm is the smallest change that can be programmed for any weight setting.

If the GS2150 will not accept a particular FINAL weight value, the best sequence in which to enter the new setting is to start by clearing the IN-FLIGHT and PRELIMINARY settings to zero, then to enter the new FINAL WEIGHT. This can then be followed by the IN FLIGHT and PRELIMINARY settings. If, following this procedure, any of these settings are not accepted, the GS2150's weight capacity and Hysteresis settings should be checked.

Limiting values for the GS2150's settings are:

FINAL WEIGHT

This setting can be anywhere in the range of 0% to 102% of the installed capacity of the GS2150 providing the setting is **GREATER** than the "IN-FLIGHT plus Hysteresis" settings and **GREATER** than the "PRELIMINARY plus Hysteresis" setting.

Examples of FINAL WEIGHT setting limits for a GS2150 installed with a capacity of 50Kg in 20gram increments are:-

The maximum FINAL WEIGHT is 51.00kg. This is 102% of the GS2150's installed capacity of 50Kg.

The minimum FINAL WEIGHT setting is 0.04kg with the IN-FLIGHT and PRELIMINARY settings at zero and the Hysteresis setting at the minimum of 1 division. This minimum value of 0.04kg for this installation is the hysteresis setting of 1 division (0.02Kg) plus 1 division (0.02Kg).

Minimum FINAL WEIGHT with either of the in-flight or preliminary settings at 0.10Kg and the Hysteresis setting at 1 division is 0.14Kg. This value is the in-flight or preliminary setting of 0.10Kg plus the hysteresis setting of 1 division (0.02Kg) plus 1 division (0.02Kg).

NOTE- If these limits were not applied the GS2150 could not turn ON the material feeders with falling weight, as this occurs at (Final Weight - (In Flight + Hysteresis + 1)).

IN-FLIGHT compensation.

The GS2150 turns the slow speed feeder OFF when the batched weight equals or exceeds the FINAL WEIGHT minus the IN-FLIGHT setting.

If the batch control setting is on the GS2150 latches its slow speed feeder output off. If, however, the batch control setting is off, the GS2150 does not latch its outputs OFF; it will turn the slow speed feeder ON again as soon as the weight falls below the FINAL WEIGHT minus the IN-FLIGHT setting minus the Hysteresis setting.

The IN-FLIGHT setting can be anywhere in the range of 0% to 102% of the installations capacity providing the setting is **EQUAL** to or **LESS THAN** than the FINAL WEIGHT less (1 division plus the Hysteresis setting). The maximum allowed value for the IN-FLIGHT setting will generally be of no interest unless batching is being carried out at small fractions of the scale's capacity.

For an installation batching 20Kg in 20gram increments with the Hysteresis setting at 4 divisions (0.08Kg) the maximum value for IN-FLIGHT is 19.90Kg and the minimum is 0.00Kg.

PRELIMINARY compensation.

The settings range for the **PRELIMINARY** cutoff setting is the same as the IN-FLIGHT setting described above.

AUTOMATIC IN-FLIGHT COMPENSATION ADJUSTMENT.

The GS2150 can be programmed during installation to automatically adjust the In-Flight compensation value to maintain accurate batching despite changes in the batching characteristics of the material and feeders. When this feature is ON, the IN-FLIGHT compensation setting should not be changed via the keyboard, except when a new material is to be batched, requiring a new In-Flight initial value. If required, the automatically adjusted In-Flight compensation value can be "called up" and noted using the keyboard. For further details on Automatic In-Flight compensation adjustment see page 18 .

3.7 Operation of the batch Counter.

The GS2150 includes a batch counter which can be preset via the keyboard. The batch counter can count up to 65,534 batches. The counter's preset value is saved during power failure, however, the present actual batch count will be lost. Where retention of the present batch count is required, a factory fitted battery supported ram (Option **BR1**) is available. This option retains the present actual batch count in the event of power failure. (**BR1** also retains the Zero Tracked value and the Tare value on power failure.)

The method of operation for the GS2150's counter is programmed during installation using the Digital Setup settings "**batch counter**" and "**batch control**" (see the Digital setup page 28 for details on programming the batch counter's method of operation).

The batch Count can be displayed while batching. It can also be preset at any time. The operation of the batch Counter is described below:-

Counting batches.

If the GS2150 is programmed on installation with its "**batch control**" setting **OFF**, it counts ONE batch WHENEVER the remote **START** input is operated.

If, on the other hand, the GS2150 is programmed on installation with its "**batch control**" setting **ON**, it counts ONE batch WHENEVER the Slow Speed feeder is automatically switched OFF to stop feeding material.

Method of Counting.

The GS2150 can be programmed to operate the batch counter in one of four ways. These are:-

count1 - The GS2150 displays the number of batches batched. The counter is increased by 1 for each batch with the batch count running from the preset value to a maximum of 65534. The GS2150 stops counting at 65534 but does not stop batching.

count2 - The GS2150 displays the number of batches remaining to be batched. The counter is decreased by 1 for each batch with the batch count running from the preset maximum value of 65534 to zero. The GS2150 stops counting at zero but does not stop batching.

count3 - The GS2150 displays the number of batches remaining to be batched. The counter is decreased by 1 for each batch with the batch count running from the preset maximum value of 65534 to zero. The GS2150 stops counting and stops batching at a count of zero. When the count of zero is reached, the GS2150 displays the message "**count**" and will not batch again until a new preset batch count is entered.

count4 - The counter is disabled and cannot be displayed or selected via the keyboard.

3.8 Operation of Automatic In-Flight.

The GS2150 includes automatic in-flight compensation adjustment to maintain the highest possible batching accuracy, without the need for operator intervention.

Automatic In-Flight Compensation adjustment, which can be turned off, is programmed during installation of the GS2150. Two settings are selected. They are an automatic in-flight adjustment limit band and a material settling time interval. The adjustment limit band sets the value each side of the required Final weight within which the GS2150 can make in-flight adjustments. The settling time interval sets the time that the GS2150 must allow the material in flight to settle and the weigher to become steady before making any adjustments.

In-Flight compensation values can be entered via the GS2150's keyboard even when the auto adjustment feature is on. The reasons for this are:- One, whenever a new material is to be batched, or there are other changes to the installation, a new initial In-Flight compensation setting should be entered. This setting will either be based on a record of earlier similar batches, or will be an estimate of the most likely value. If in doubt, an initial value of zero should be used. And two, to allow the adjusted In-Flight value to be "called up" and recorded so that it can be used as an initial value the next time the particular material or batch is produced.

For installations which always batch the same material at similar weights it should never be necessary to manually change the In-Flight compensation setting.

How Automatic In-Flight Adjustment works.

The GS2150 batches material using two outputs. These are normally used for fast and slow material feed rates. The slow speed feeder cutoff occurs when the actual weight reaches the Final weight minus the In-Flight compensation setting.

Immediately following Slow Speed feeder cutoff, the GS2150 sets an internal timer to time out the material settling time interval that was programmed on installation. When this time, which can be set to 1, 2 or 4 seconds, has passed, the GS2150 compares the actual batched weight with the required Final weight and calculates the weight error.

If the batched error is zero no adjustment is made. If the batched error is outside the programmed adjustment band (2 to 32 divisions) it may be the result of a “once off” problem and no adjustment is made.

If the batched error is the same or less than the adjustment band the GS2150 changes the In-Flight compensation setting by half the error so that, over two or three batches with accurate feeders, the error can reduce to zero. In addition to making the In-Flight compensation adjustments, the GS2150 turns off the batch complete output after the material settling time period has expired. The batch complete output was turned on when material feeding commenced.

The Auto In-Flight Adjustment settings are contained in the section Digital setup on page 26.

Note: In-Flight compensation settings entered via the GS2150’s keyboard, including any initial new settings, are saved even in the event of power failure. The current value, which may be the result of automatic adjustment, is not saved on power failure unless the GS2150 is fitted with battery backed memory Option **BR1**. Without **BR1**, the GS2150 restores the initial value on power up and, within a few batches, will have adjusted it to the most accurate value possible.

3.9 Operation of the Remote Inputs.

The GS2150 includes 4 optically isolated control inputs described in detail below. Connections are only required to inputs which are to be used. Unused inputs are ignored by the GS2150.

(For connection details and electrical specification of the GS2150’s Inputs see page 6. For Digital setup settings that control the operation of the Inputs see the “*batch control*” and “*batch type*” settings on page 29.

KEY LOCK

This input is “unlocked” when open circuit or when no connection is made to the GS2150, and “locked” when closed. The effect of the “locked” input depends upon the locking scheme selected during installation of the GS2150. Locking schemes are available to lock ALL the GS2150’s front panel keys, or to lock only some of the keys. Access to the GS2150’s optional accumulated totals is ALWAYS locked out when the lock input is in the “locked” condition. The GS2150 displays the message “-*Locd*-” when a locked key is operated and the key is ignored. For full details of the GS2150’s locking schemes see Digital Setup page 28.

TARE/HOLD

The operation of this input depends upon the GS2150’s Digital Setup settings “*batch control*” and “*batch type*” described on page 29. Regardless of the setup of the GS2150 this input requires a momentary closure of the remote device (key or switch) to be recognized by the GS2150.

When the GS2150 is setup with the “*batch control*” setting **OFF** or simply **ON** (*bc.OFF* or *bc.ON*) this input always acts as a TARE function. When operated the GS2150 acquires the Gross weight as a tare value resulting in a Net weight of zero. The GS2150 will automatically display the Net weight if the Gross weight was displayed but it will not change the display if batch counts are displayed. A tare is acquired even if the weigher is in motion, additionally the tare value can be acquired over the entire installed weight capacity of the GS2150.

When the GS2150 is setup with the “*batch control*” setting **ON** plus Auto Acquire TARE (*bc.OnAt*), this input acts as **HOLD** function rather than a **TARE** function unless the GS2150 is batching by Gross weight, in which case this input has no function.

When the GS2150 is setup to batch in or out by net weight, a **HOLD** input has the following effect:-

- If the feeders are **ON** they are turned **OFF**.
- If the batch complete output is **ON** it is turned **OFF**.
- The message “*Hold*” is displayed for 2 seconds.
- If this is the first time that the “**HOLD**” input was operated the current net weight is saved to the “memorized” batch total.
- If this is **NOT THE FIRST** time that the “**HOLD**” input was operated the present net weight is added to the “memorized” batch total.

The “**HOLD**” input can be operated an unlimited number of times to “pause” a batch and to add the amount batched so far to the “memorized” total.

STOP/RESET

This input has no effect if the GS2150 has been installed with its “*batch control*” setting **OFF**. If the “*batch control*” setting is **ON**, a momentary closure of the **STOP/RESET** input will latch the material feeders and the batch complete output **OFF**. The **STOP/RESET** input also clears the “memorized” batch weight so that a **START** input commences a full batch rather than continuing a partially completed batch.

START/CONTINUE

If the GS2150 has been installed with the “*batch control*” setting **OFF** a momentary closure on this input is used only to increment or decrement the batch counter.

If the GS2150 has been installed with the “**batch control**” setting **On** (that is “**bcOn**” but not “**bcOn.At**”), a momentary closure on the **START** input is used to start a batch by turning the material feeders and batch complete output ON. In addition, the Zero Track facility is automatically turned OFF.

If the GS2150 has been installed with the “**batch type**” setting to batch by Net weight and the “**batch control**” setting **On** plus Auto Acquire Tare (“**bcOn.At**”), a momentary closure on the **START** input acts either as a **CONTINUE** input or a **START** input depending upon whether it follows a **HOLD** input, a normal batch finish or a **STOP** input. Each is described below:-

START/CONTINUE following a HOLD input

- The message “**CONT**” is displayed.
- Operating the **START/CONTINUE** input again will cause the GS2150 to acquire a tare to zero the net weight and then to resume batching “where it left off”, using the “memorized” batched weight to calculate the remaining weight to batch. Feeding will continue normally until the weight of material batched plus the total of material in the “memorized” registers equals the required weight (The Final weight) at which time feeding will cease. Automatic In Flight compensation adjustment operates normally.
- Operating the **STOP/RESET** input clears the “memorized” batched totals allowing a batch to be started from the beginning.
- Operation of any other input while “**Cont**” is displayed, including any of the GS2150’s front panel keys, is ignored by the GS2150 except that it briefly blanks the display to confirm proper operation.

START/CONTINUE following STOP or batch complete.

- No messages are displayed.
- As the “memorized” batched weight will have been cleared by the earlier **STOP** key or the normal completion of a batch, it is not taken into account.
- The GS2150 acquires a tare to zero the net weight and commences batching using the Final weight to calculate the remaining weight to batch. Feeding will continue normally until the weight of material batched equals the required weight (The Final weight) at which time feeding will cease. Automatic In Flight compensation adjustment operates normally.

3.10 Batching & Operation of the Outputs.

Introduction.

The GS2150 batches by feeding material using one or two feeders - normally as a fast feeder and a slow feeder. The GS2150 can batch material into a weigh hopper or bag using Net or Gross weight. Also, it can batch material out of a weigh hopper or bag using Net weight.

Batch settings which are changed frequently are entered directly via the GS2150’s front panel keyboard. These comprise a preset batch COUNT, the required FINAL weight and settings to turn off the high speed (PRELIMINARY) and slow speed (IN-FLIGHT) feeders. The Hysteresis, Automatic In-Flight and Zero Band settings, which are seldom changed, are programmed using Digital Setup. (see Digital Setup pages 25 and 26).

The GS2150 can be programmed to latch its feeder control outputs OFF when the required Final weight is reached. Alternatively, the GS2150 can be installed to “not latch” its outputs when the Final weight is reached. With this latter “non-latching” method, the feeder outputs will turn ON again if the weight falls below the Final weight by an amount in excess of the In-Flight and Hysteresis settings. The GS2150’s Zero Band output is always non-latching. The batch complete output is always OFF unless the GS2150 is programmed with “batch control on”, in which case the batch complete output latches off when the batch is finished.

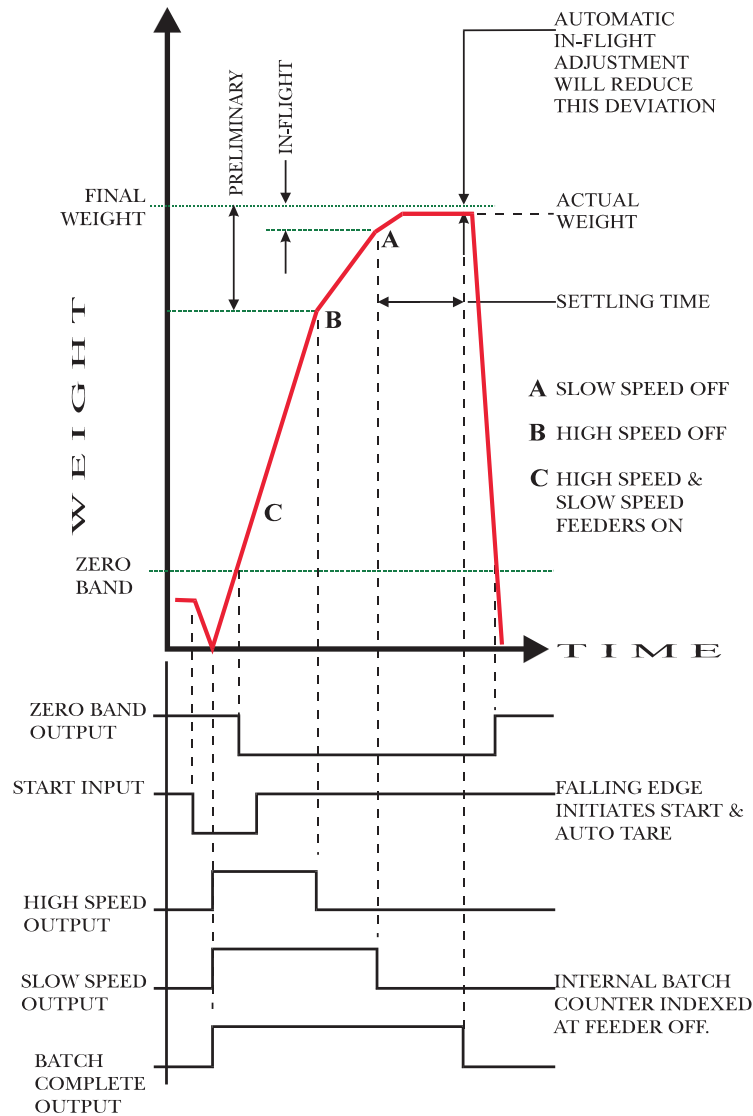
The GS2150 includes a batch counter which can be preset. It can be installed to display batch counts and not stop batching OR installed to display batch counts and stop batching, when the required number of batches is completed.

The GS2150 includes four logic inputs. Three of these can be used to control the batch process. The other is used to lock out the GS2150’s front panel keyboard.

The batch control inputs are described in detail in the previous chapter. Generally they comprise a **START/CONTINUE** to commence a batch and, if required, acquire a tare, a **STOP/RESET** to stop feeding, and an Acquire **TARE/HOLD** input for use if the tare value is not acquired automatically following **START** or to hold a batch.

Batch Cycle.

The drawing on this page shows one of many possible batching cycles using the GS2150. In this example, the GS2150 has been programmed to batch in by Net weight; the “*batch control*” setting is **ON** and the GS2150 is to automatically acquire a tare on START. Automatic In-Flight adjustment is on and set for 8 divisions with a settling time of 2 seconds. In the drawing, the time between the START input and the feeders being turned on has been stretched to make it visible - in practice this period may be as short as a few milliseconds.



The batch commences with a START input. The GS2150 automatically tares the Gross weight to arrive at a Net weight of Zero. Both material feeders and the batch complete output are turned on with material being fed at a rate controlled by both feeders. While the weigh hopper (or bag) is being filled, the GS2150 compares the actual weight with the target settings at a rate up to 800 times/second using the GS2150's linear predictive modelling.

When the “Final weight minus the Preliminary setting” is reached the High Speed feeder output latches off. Feeding continues at the Slow Speed feeder rate until the “Final weight minus the In-Flight setting” is reached. The Slow Speed feeder output latches off. The Batch Counter is then incremented or decremented by one and the settling time interval of 2 seconds commences. After this time the GS2150 makes any necessary In-Flight adjustments and latches the batch complete output off. If the GS2150's **optional TOTALS** accumulator is installed, the GS2150 adds the batched weight to the NINE digit total and adds 1 to the NINE digit accumulated batch counts.

Simple external controls can now discharge the hopper or bag using the Zero Band output to detect the empty condition prior to commencing another batch.

4 FULL INSTALLATION DETAILS.

Installation of the GS2150 involves these nine steps:-

- 1) Unpack the GS2150. Check the supply voltage.
- 2) Program the Digital Setup Parameters.
- 3) Attach the weight units label to front of GS2150.
- 4) Connect the load cell/s.
- 5) Zero the scale's dead load.
- 6) Apply a weight and span calibrate.
- 7) Connect the external equipment to the GS2150.
- 8) Carry out test to check the systems operation.
- 9) Replace and (if required) seal the GS2150's front panel nameplate.

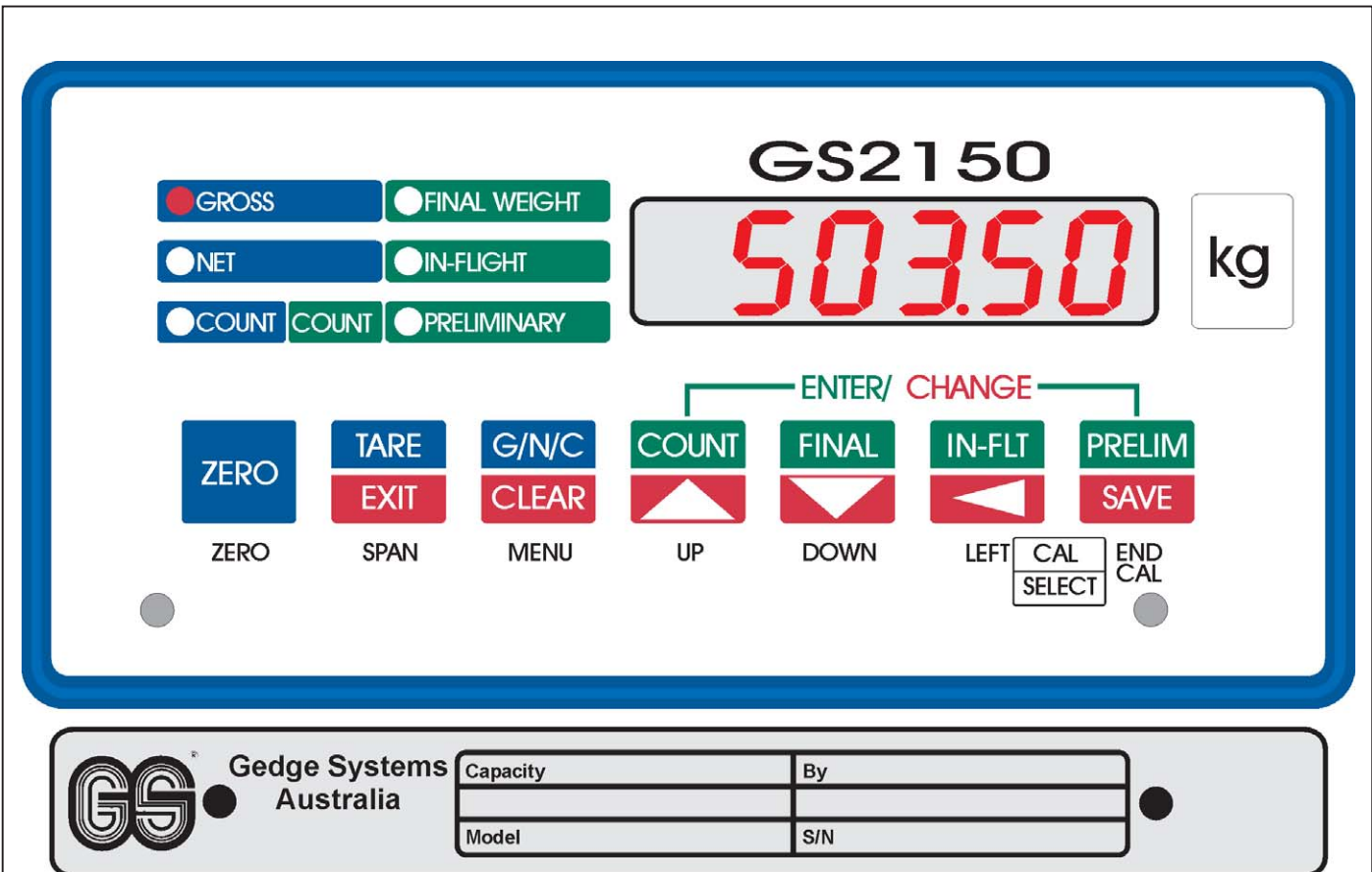
WARNING. ALWAYS MAKE SAFE OR DISCONNECT ALL EXTERNAL DEVICES CONTROLLED BY THE GS2150 BEFORE CALIBRATING OR ENTERING DIGITAL SETUP.

4.1 Unpacking

The GS2150 shipment comprises:-

- a) GS2150 Instrument.
- b) Power Cord.
- c) This Manual.
- d) Weight Units Label kit.
- e) Panel mounting slides kit.
- f) Load cell cable connector and back shell.
- g) Control cables removable screw connector.

Check and ensure all of the above are included in the shipment. Check the GS2150's rear panel and ensure the operating voltage is the same as the power to be connected to the GS2150.



4.2 Introduction to calibration.

The GS2150 achieves easy and fast installation by a mostly automatic process using only the front panel keys for calibration and setup. There are no internal “hidden” switches and potentiometers in the GS2150 - all controls are external - all settings are achieved using only the front panel keyboard.

Removal of the sealable front panel nameplate gains access to the *CAL* key and shows the installation description for each of the keys. The installation function of the keys is :-

CAL

Starts calibration. The lamps flash and the message *CAL* is displayed. Keying *CAL* again steps the GS2150 through the Digital Setup settings.

END CAL

Ends calibration. Key during digital setup to save settings and return to normal weighing and batching. Key while *CAL* is displayed or during span calibration to return to normal weighing and batching without changing the calibration settings.

LEFT

Sets the value 1 to 10,000 by which the keys *UP* and *DOWN* change the displayed setting. The digit to be changed flashes.

DOWN

Changes the displayed value by decreasing the digit which is flashing. Used to change the span calibration weight and the digital setup display resolution value. During digital setup this key displays the available parameter settings.

UP

Changes the displayed value by increasing the digit which is flashing. Used to change the span calibration weight and the digital setup display resolution value. During digital setup this key displays the available parameter settings.

ZERO

Keyed following *CAL* to automatically zero out the weighing system's dead load offset.

SPAN

Keyed following *CAL* to start automatic span calibration. The maximum installed weight capacity of the GS2150 is first displayed for 5 seconds followed by 000000. Use the keys *UP*, *DOWN* and *LEFT* to enter the calibration weight. Key *SPAN* again to automatically span the GS2150 to the required displayed value.

4.3 Digital Setup

Digital setup is used to program the GS2150's method of operating by making selections for each of the GS2150's operating parameters. During programming, the GS2150 displays symbols for each parameter with the most frequently changed parameters being displayed first. The table below lists each digital setup parameter with example settings. Full details are contained in the section that follows the table.

Digital Setup Parameters	
Suggested Settings	Comments
ob.g 2	zero band - this setting, in display divisions for the selected gross or net weight, operates the zero band output. The output is on whenever the gross/net weight is within the zero band. The value will depend upon the application.
ot3 - 2	zero tracking - automatic gross zero maintenance. The left hand value is the zero track band. The right hand value is the motion limit in display divisions per second. Start with a zero track band of 3 and a motion limit of 2 divisions per second. This setting should be off during weight calibration.
AIF.16.2	Automatic In-Flight adjustment. The left hand value is the band within which automatic adjustments are made. The right hand value is the settling time in seconds. If set to OFF the batch complete output is turned on 1 second after Slow Speed feeder cutoff. Otherwise the time setting of 1, 2 or 4 seconds is used for the batch complete signal. Make the initial setting 16 display divisions and 2 seconds and tune the installation trying different settings.
HY 2d	Hysteresis - this setting has no effect if the batch control setting is on (bc On or bc On.At). Otherwise this setting programs the feeder control "dead band". The setting will depend upon the application.
dr 2	display rate - select a rate divider to provide a steady display. Start with 2.
cr 1	comparator rate - the rate at which the GS2150 compares set weights to actual weights. Start with 1 and increase it to 2, 4 etc if feeders are not steady.
LP OFF	Linear predictive modelling - start with linear prediction OFF .
rAngE1	range - load cell millivolt input range. Start with range 1. If greater speed required try 2 and 3. (Full load input for each range is:- 1 30mV, 2 20mV and 3 10mV)
d 10000	display divisions - select the required number for the weight to be displayed.
dP0.00	decimal places - select the required number for the weight to be displayed.
Cb 1	count by - select the required number for the weight to be displayed.
bt.In n	batching type - select the required batching method depending upon the application. Batching by net weight is required for the "hold/continue" feature.
nd.n L1	normal display and key locking scheme - selects the display the GS2150 should show most of the time and the keyboard locking scheme used when the remote key lock input is "locked". The selection will depend upon the application.
count3	batch counter - select the method of operation for the batch counter. The selection will depend upon the application. Count4 disables the counter.
bc On.At	batch control - select batch control " On " if the GS2150 is to latch the outputs. Select " On.At " if the GS2150 is to acquire a tare at the beginning of the batch and to enable the "hold/continue" feature.

Digital setup selections are programmed by keying **CAL** then **CAL** again to display each parameter. The keys **LEFT**, **UP** and **DOWN** are used to display and change settings for each parameter. Keying **END CAL** saves the settings after all the changes have been made. There is no need to display all the parameters before keying **END CAL** to save changes. If the first parameter is the only change then **END CAL** can be keyed immediately after the required setting is selected.

4.4 Digital Setup Parameters

Following are details of each of the GS2150's digital setup parameters.

Zero band.

ob.g 2

The GS2150's zero band, which is programmed for gross or net weight, over the range of 0 to 80 display divisions, controls the GS2150's zero band output. The zero band output will be ON when the selected gross or net weight (plus or minus) is equal to or less than the zero band setting. The zero band output is not affected by any of the GS2150's inputs or batch control settings and is active at all times.

Settings for gross are ob.g 0, ob.g 1, ob.g 2, ob.g 5, ob.g 10, ob.g 20, ob.g 40, ob.g 80.

Settings for net are ob.n 0, ob.n 1, ob.n 2, ob.n 5, ob.n 10, ob.n 20, ob.n 40, ob.n 80.

For example, a zero band setting of 2 divisions for net weight on a scale programmed to display 1Kg per division, will result in the zero band output being ON when the **net** weight is in the range - 2kg to + 2kg, and OFF for all other weights.

Zero tracking.

ot3- 2

The Zero Track setting programs the GS2150 to automatically maintain a gross weight of zero despite small amounts of "drift" in the weighing installation. The zero track setting, which can be automatically turned off while feeding material, sets values for the zero track band and motion limit. The GS2150 flashes the Gross, Net or Count lamp when the weigher is in motion to indicate that the Zero Track feature is active and that motion is occurring.

The GS2150 will zero track until the accumulated zero track value plus any key ZERO value reaches 4% of the installation's capacity. At 4% of capacity, the GS2150 will no longer acquire zero values if they cause the accumulated value to exceed 4%. This 4% limit is set so that, even with the acquired zero at 4% of capacity, the weigher can still weigh to full capacity without "going off scale".

Weigher drift which exceeds 4% will generally indicate an installation fault and should be investigated. Zero values acquired by use of the ZERO key are always saved during power failure. Automatic zero tracked values are not saved during power failure unless the GS2150 is fitted with the Optional **BR1** battery supported memory.

The GS2150 "zero tracks" by continually measuring the motion of the weigher. When the weigher's motion falls below the "motion" value the GS2150 checks the gross weight to see if it is below the zero track band. If it is, the gross weight is "zeroed out".

For example, in an installation programmed for 50Kg in 10gm scale divisions, a zero track setting of "ot3-2" sets the zero track band at 3 divisions (30gm) and the motion limit at 2 divisions per second (20gm/second). When the weigher's motion falls to or below 20gm/second the GS2150 checks the gross weight. If the gross weight equals or is less than the zero track band the gross weight is acquired as zero and zero weight displayed.

All weighing installations have some time and temperature induced drift. Sometimes this drift is not visible because it's small compared to the overall resolution of the weighing system.

Other times, when a large number of scale divisions are used on load cells which are only lightly loaded this drift can become both visible and significant.

Generally, batching by Net weight will avoid the impact on accuracy of any gross zero drift but it will not avoid the fact that the displayed gross weight of the empty scale is not always zero. When batching by gross weight any "non - zero" condition will affect the batching accuracy.

All of these potential problems are avoided by using the GS2150's automatic zero maintenance zero tracking feature which will compensate for zero drift.

Displayed Setting	Zero Track Band dd.	Motion Time dd per second.
<i>otOFF</i>	disabled	
<i>ot1- 1</i>	1	1
<i>ot3- 1</i>	3	1
<i>ot9- 1</i>	9	1
<i>ot1- 2</i>	1	2
<i>ot3- 2</i>	3	2
<i>ot9- 2</i>	9	2
<i>ot1- 4</i>	1	4
<i>ot3- 4</i>	3	4
<i>ot9- 4</i>	9	4
<i>ot1- 8</i>	1	8
<i>ot3- 8</i>	3	8
<i>ot9- 8</i>	9	8
<i>ot1-16</i>	1	16
<i>ot3-16</i>	3	16
<i>ot9-16</i>	9	16

Auto In-Flight Adjustment.
AIF. 8.2

The GS2150 can make small automatic adjustments to the In-Flight setting whenever the batched weight is not exactly the required Final weight. These automatic changes are made after the Slow Speed feeder is turned off. A material settling time is then allowed. If after this time the weight error is within the automatic adjustment band the GS2150 will change the In-Flight setting by half the actual batched error. Automatic In-Flight adjustments are only made if the GS2150's "batch control" setting is **ON**. The available settings are shown below. For a full description of the operation of the automatic in-flight feature refer to page 18.

Displayed Setting	Automatic In-Flight Adjustment Band dd	Motion Settling Time and Batch Complete Output delay in seconds.
AIFOFF	disabled	1
AIF 2.1	2	1
AIF 4.1	4	1
AIF 8.1	8	1
AIF16.1	16	1
AIF32.1	32	1
AIF 2.2	2	2
AIF 4.2	4	2
AIF 8.2	8	2
AIF16.2	16	2
AIF32.2	32	2
AIF 2.4	2	4
AIF 4.4	4	4
AIF 8.4	8	4
AIF16.4	16	4
AIF32.4	32	4

Hysteresis Setting.
HY 5d

When the GS2150 batches with the "batch control" setting OFF the feeder control outputs are "non latching". The hysteresis setting will prevent "relay chatter" at the cutoff weight by the inclusion of a "dead band". This "dead band" or "hysteresis" is user adjustable from 1 to 6 display divisions. Mechanically noisy installations will require hysteresis settings in the range 3 to 6 display divisions to avoid relay chatter. The "dead band"/" hysteresis" is automatically located above or below the weight setting by the GS2150 when the "batching type" is selected.

display rate.
dr 2

This setting programs the rate that the GS2150 changes the displayed weight. The display rate/second is arrived at by averaging 1, 2, 4, 8 or 16 weight samples. The greater the number of samples averaged the steadier will be the display. Medium to slow update rates are easier for the operator to watch during manual feeding than fast update rates.

This rate has NO EFFECT on the rate at which the GS2150 compares the batched weight to the weight settings - it ONLY controls the steadiness of the display. If the comparator rate (below) is set to 1 or 2 for maximum speed then suggested settings for the display rate are 2 or 4.

comparator rate.
cr 1

The comparator rate is much more important than the display rate, as it affects the way the GS2150 batches material. The comparator rate value sets the rate at which the GS2150s compares the weight of material batched to the required weight settings. The actual comparison rate is arrived at by averaging 1, 2, 4, 8 or 16 actual batched weight samples and comparing the average with the required weight settings. Generally, the greater the number of samples averaged the steadier will be the weight value used. However, the cutoff timing may be slower (unless Linear Predictive Modelling is used).

The best value for a particular application will ONLY be arrived at by experimentation. This value is adjustable from 1 to 16 with the comparator actual rate in comparisons per second being as shown below.

Selection	Comparator Rate/Second		
	range 1	range 2	range 3
cr 1	29	34	44
cr 2	14.5	17	22
cr 4	7.2	8.5	11
cr 8	3.6	4.2	5.5
cr 16	1.8	2.1	2.8

Linear Prediction.
LP On

The GS2150 includes Linear Predictive Modelling. This feature allows the GS2150 to compare the actual weight to the preset weights at an effective rate of 800 times/second **REGARDLESS OF THE COMPARISON and UPDATE RATE** used. Material feeders can be controlled to a time accuracy better than 1.25milliseconds. The advantage of this technique should be visible in even medium speed batching applications.

For example, feeding material at a rate of 10Kg/second would generally mean that each weight sample for the GS2150 running at its maximum update rate of 44/second would be 0.23Kg. It would not be possible to batch to a greater accuracy than this.

However, using the GS2150's Linear Predictive Modelling at 800/second, each weight sample appears as 0.01Kg (10Kg per second divided by 800). It is then possible to batch to an accuracy 23 times better at 0.01Kg.

To obtain the best from this technique the material feeders should be fast and repeatable. The feeder rate, in addition to being fast must also be steady.

Maximum batching speed and accuracy for any installation will only be found by experimentation. The recommended procedure is to first turn Linear Prediction off and experiment with "comparator rates" until a combination of speed and repeatability is obtained. Then turn Linear Prediction on and increase the feeder rate until the fastest throughput at the desired accuracy is obtained. Turning Linear Prediction on may not always improve accuracy if the feeder rates are low. As the feeder rates are increased Linear Prediction will improve batched accuracy.

range.

rAngE1

The range selection sets the maximum millivolt level for the GS2150's load cell input. The purpose of this selection is to provide faster weight comparisons where possible. For installations where the highest speed is not required range 1 should be selected as this will provide the widest millivolt input range. For installations where the highest speed is required, the millivolt output of the total live and dead load on the load cell should be measured and a range selected which is just in excess of this. Regardless of the range selected, the GS2150 can still be calibrated to a maximum sensitivity of 1microVolt/Division.

Range	mV Input	Max comparator Rate/sec.
1	30	29
2	20	34
3	10	44

RECOMMENDATION - Calibrate the installation using range1 and then, if a higher speed is required, apply 103% load to the scale. With full load on the scale select range2. If the GS2150 does not show an off scale message either leave the setting at range2 OR, if a higher speed is required, try range3. The GS2150 will exhibit no calibration shift as the ranges are changed.

Resolution in display divisions.

d 10000

Display resolution in display divisions. Adjustable 400 to 10,000 divisions in 100 division steps. The maximum display resolution setting is automatically limited depending on the "Count By" setting to ensure that a display of 199,990 is not exceeded.

Count by	Maximum d
1 TO 10	10,000
20	9,500
50	3,900

This setting programs the smallest weight that can be displayed by the GS2150. It also programs the smallest setting increment for the weights to be batched. For example, a 50Kg (50,000gm) installation programmed for 1000 divisions (1000 parts) can display 50gm increments [50Kg/1000 = 50gm]. Target weights can be set and batched to 50gm, for example 20.05Kg. If greater accuracy is required, programming the GS2150 for 5000 divisions will allow 10gm increments to be displayed and entered as required weights. For example 20.01Kg, an improvement in accuracy based on resolution of 5 to 1.

Decimal Places.

dP.0000

Number of decimal places from none to 0.0000

This setting has no effect on the accuracy of the installation. It is only used to allow the weight to be displayed in suitable units. For example, 50Kg can be displayed as 50000gm or, using a decimal point with 3 decimal places as 50.000Kg.

Count By.

Cb 5

Minimum display steps regardless of decimal place. Adjustable 1, 2, 5, 10, 20 & 50 The maximum value is limited by the display "resolution" setting to ensure a display greater than 199990 does not occur.

Resolution	Count by max.
400 to 10,000	10
400 to 9,500	20
400 to 3,900	50

This setting does not affect the overall accuracy (resolution) of the installation. The "count by" setting is used to set the maximum "weight number" that will be displayed as well as the value of each weight increment. The displayed maximum weight will be the "resolution" setting multiplied by the "count by" setting. For example, an installation batching 50Kg can be programmed for 5000 divisions with a count by setting of 10. This will result in a display of 50000 (5000 divisions x count by 10 = 50000). The same installation could be programmed for 2500 divisions with a count by of 20 (2500 x 20 = 50000) or 1000 divisions with a count by of 50 (1000 x 50 = 50000). Arriving at the best combination of "resolution" and

“count by” is a matter of working out the required resolution accuracy, then setting a count by so that the maximum weight can be displayed. A decimal point can then be used to display, for example, Kilograms, or not used if a display in grams is required. The GS2150 is not restricted to Kg and gm - any units can be displayed.

batch type.

bt.In n

The “batch type” setting programs the batching method. The GS2150 can batch in by gross weight or net weight or batch out by net weight. When the batching method is programmed, the GS2150 will automatically position all the Hysteresis, In Flight and Preliminary settings in the correct location with respect to the Final weight setting. If the GS2150’s “hold” and “continue” feature is required the selection must be either “in by net weight” or “out by net weight”. This feature is disabled when batching by gross weight.

The selections are:-

Selection	Batching Method
<i>bt.In g</i>	In by gross weight.
<i>bt.In n</i>	In by net weight.
<i>bt.Out.n</i>	Out by net weight.

normal display/key locking scheme.

nd.n L1

The normal display and key locking scheme programs both the value to be displayed most of the time by the GS2150, AND the effect that the remote key lock input has on the front panel keys.

The **normal display** selection of gross weight “*nd.g*”, net weight “*nd.n*” or batch counts “*nd.c*” will select the value displayed by the GS2150 at power up, following calibration and on “time out” of a setting display.

During normal operation the “G/N/C” key can be used to display other settings. HOWEVER, the GS2150 will revert to the “normal” display selection following power up, calibration and on “automatic time out” of a setting display.

When the GS2150’s counter is disabled, batch counts cannot be displayed even if selected in this setup setting. If the “normal display” selection of counts is made, the gross weight will be displayed instead of counts.

The **locking scheme** selection “*L1*” to “*L4*” selects the GS2150’s response to the operation of the front panel keys when the remote key lock input is “locked”. All keys which are operated while “locked out” result in the message “*-Locd-*” being displayed and the key ignored.

The effect of the GS2150’s remote key lock input being “locked” for each of the key lock schemes is:

L1 When locked, all the GS2150’s front panel keys are locked out.

L2 When locked the CAL key is inoperable. Also prevents access to the count, final weight, in flight and preliminary settings using the COUNT, FINAL, IN-FLT and PRELIM keys. The batch counter can be displayed using the G/N/C key. Accumulated totals cannot be accessed.

L3 When locked the CAL key is inoperable. Batch counts cannot be displayed or accessed via either the G/N/C key or the COUNT key. Accumulated totals cannot be accessed. The final weight, in flight and preliminary settings can be accessed and changed.

L4 when locked all keys are operable but access to the optional accumulated totals is prevented.

batch counter.

count3

The GS2150 includes a batch counter which can be programmed to operate in a number of ways, including disabled. See the full description of the operation of the batch counter on page 18 for further details.

Programmable settings are:-

count1 - Counting Up from a preset value to a maximum of 65,534 and stop counting (but not batching).

count2 - Count down from a preset value to 00000 and stop counting (but not batching).

count3 - Count down from a preset value to 00000 and stop batching with the message “count” displayed.

count4 - Counter is disabled. Batch counts cannot be entered or displayed. The GS2150’s keys which select counts have no effect.

batch control.*bc On*

The GS2150 can be programmed to operate in a “batch control” mode (**bc On**) using the external **START** and **STOP** inputs to initiate batching, OR it can be programmed to operate in a “non control” mode (**bc OFF**) where the **START** and **STOP** inputs do not control the batching process. In addition, when the GS2150 is programmed to operate in the “batch control” mode with the Auto Tare function ON (**bcOn.At**), the operation of the start, stop and tare inputs are expanded to include **START/CONTINUE**, **STOP/RESET** and **TARE/HOLD** as described on page 19.

The GS2150's Zero Band output is operated all of the time for all “batch control” settings.

The GS2150's Batch Complete output is only active if the “batch control” setting is **On** or **On.At**. A brief description of the batching cycle and selections is included below. Refer to the section “Batching Operation” on page 20 for further information.

The GS2150's optional TOTALS accumulation of batch counts and weight is **ONLY** active if batch control is ON. (That is **bc ON** or **bcOn.At** is selected)

NOTE:- In the explanation below, “set weights” refers to the “Final weight minus the In-Flight setting” which controls the Slow Speed feeder output and the “Final weight minus the Preliminary setting” which controls the High Speed feeder output. “Weight” refers to batched weight or weight on the scale.

Selection of batch control off “bc OFF”

The GS2150 batches using external latching logic to latch its feeder outputs off. With this selection the GS2150 drives its two feeder control outputs all of the time. The batch complete output is always off. Zero tracking is not automatically turned off when batching because this method of batching has no START batch concept. Automatic zero tracking must be programmed so that the motion condition resulting from feeding materials prevents the GS2150 from acquiring values near zero while feeding. The START input can be used to increment the batch Counter and this is its only function with batch control turned off. The TARE input can be used to acquire a tare. The STOP input has no function.

For increasing *weight*, the feeder outputs will be ON if the *weight* is less than the *set weights*. As the *weight* reaches and exceeds the *set weights* the feeder control outputs are turned off and remain off until the *weight* falls below the *set weights* minus the hysteresis setting.

Example of an installation of 2000Kg in 1Kg divisions. Final weight 200Kg, In-Flight 10Kg and Hysteresis 6Kg (6divisions). The Slow speed feeder output will be ON as the weight increases to 190Kg (200 - 10) at which point it will go OFF. The Slow Speed feeder output will not turn ON again until the weight falls below 184Kg (200 - {10 + Hysteresis 6}). The High Speed feeder output behaves in the same way but uses the Preliminary cutoff setting instead of the In-Flight setting.

Selection of batch control on “bc On”

The GS2150 batches using its own internal latching logic to latch the materials feeder outputs and batch complete output off. Zero tracking is automatically turned off whenever the GS2150 is feeding material. The START input commences a batch. Providing the *weight* is less than the *set weights* the GS2150 will turn its feeder and batch complete outputs on. As the *weight* reaches and exceeds the *set weights* the feeder control outputs are latched off. They remain off until the next START signal. The batch counter is incremented when the Slow Speed feeder is turned off. A STOP input can be used to stop the batch, a further START input will restart the batch. The TARE input can be used before the START input to acquire a tare value for Net weight batching. The hysteresis setting has no effect.

Example of an installation of 2000Kg in 1Kg divisions. Final weight 200Kg, In-Flight 10Kg. The Slow speed feeder output will be OFF until a START input is received. Following a START input, zero tracking will be turned off as feeding commences. Once the slow speed feeder and batch complete outputs are turned ON they will remain ON as the weight increases to 190Kg (200 - 10) at which point the slow speed feeder will latch OFF and remain OFF until the next START input. The batch complete output will latch OFF after the material settling time has expired. The High Speed feeder output behaves in the same way the Slow Speed feeder but uses the Preliminary cutoff setting instead of the In-Flight setting. Note - the batch complete output will **ONLY** be turned on if the Slow Speed feeder is turned on.

Selection batch control on/acquire tare “bcOn.At”

The GS2150 batches in a similar way to the “*bc On*” selection above except that:-

When batching by net weight the “hold/continue” feature is enabled. See page 19 for more details.

The GS2150 automatically acquires a Tare value following the START/CONTINUE input.

4.5 Weight Units Labels

The GS2150 front panel is printed with the units **kg.** However, the GS2150 can be calibrated to any units. If other weight units are required select the appropriate label from the “labels kit” supplied with the GS2150. Labels are provided for :- **lb, g, N, kN, oz, oz t, lb t, t** and a blank label for customized units.

4.6 Load Cell Connection

Before connecting the load cell/s to the GS2150 ensure that the entire load cell cable has shield continuity and that a high quality **BRAIDED** shield is used. Also ensure that the shield is NOT grounded at the load cell end, although, in some situations a ground at the load cell end has been found to diminish interference. Load cell connection is via a rear mounted 9 pin D male connector. A mating cable connector is provided.

The shield **MUST** be connected to the back shell by crimping it between the 2 shells ensuring there is no gap between the shells **AND** it **MUST** also be connected to pin 6 or 9 of the load cell connector. High power radio transmitters in factories and vehicles makes the use of proper load cell installation techniques important. Failure to strictly follow the installation techniques provided in this manual for the load cells and any other equipment may make the installation unacceptably sensitive to interference.

Refer to the load cell connection table and drawing on page 5 of this manual for the connector pin details.

4.7 Weight Calibration

Weight calibration involves zeroing out the dead load offset of the weighing installation and spanning the GS2150 display for the desired weight. Digital setup should be completed before weight calibration. Also, for best results, allow the indicator and load cell/s to warm up for 30 minutes or more.

Selection of digital setup “**range1**” is recommended for weight calibration as this allows the widest electrical input from the load cells. If higher speed is required, different ranges can be tried after calibration. (see the digital setup parameter “**range**” on page 27 for further information.)

EITHER DISCONNECT OR OTHERWISE MAKE SAFE ALL EXTERNAL DEVICES CONTROLLED BY THE GS2150's OUTPUTS BEFORE PROCEEDING.

Zero Out The Dead load Offset

1) Remove all live loads from the weighing system. Set the digital setup parameter “**normal display**” to show gross weight (**nd g**). This setting is not essential to weight calibration but it will make it easier to see that the GS2150 has been calibrated to the correct weight.

2) Check the GS2150's display. If the display contains a weight or the message “**—**” proceed to step **3**. If, however, the message “**OFF**” or “**-OFF**” is displayed, the electrical input from the load cells is outside the GS2150's calibration range and the GS2150 will be unable to calibrate the input to zero. If either of these messages is displayed, set the digital setup parameter “**range**” to 1 (**range1**). This setting allows a load cell input of up to 30mV. This level is unlikely to be exceeded by the dead load on a weighing system. If the GS2150 continues to display an off scale message after “**range1**” is selected the installation or the GS2150 may be at fault - contact the factory for assistance.

3) Key **CAL** and then **ZERO**.

The GS2150 will then automatically zero out the dead load offset. Following this operation, which takes 5 seconds, the GS2150 will return to its normal weighing and batching mode. Check the display for a gross weight of zero. If the gross weight is not zero repeat step **2**. If the required adjustment was outside the GS2150's range, a message is displayed for 5 seconds. In this event the weighing installation should be reviewed. Messages are :-

C HI or **OFF** The load cell input is positive and above the dead load offset adjustment range of the GS2150.

C LO or *-OFF* The load cell input is negative and below the dead load offset adjustment range of the GS2150.

Do not continue with span calibration until a display of zero gross weight has been obtained.

Span Calibration.

Span calibration involves 1 pass using an accurately known weight. Zero calibration **MUST** be completed immediately prior to span calibration. The normal weight operation key *ZERO* must not be used to zero the display prior to span calibration. Operation of the key *ZERO* rather than the key sequence *CAL* then *ZERO* may cause zero/span interactivity on span calibration.

The GS2150 exhibits no interactivity between span and zero. Any failure to return to zero following span calibration is solely the result of hysteresis or non repeatability in the weighing installation.

1) Place a calibration weight of 50% to 100% of the scale's capacity on the scale. A weight of 100% must be used if calibration is being carried out with the range setting on "*range2*" or "*range3*". Smaller weights can be used if calibration is being carried out with the range setting on "*range1*".

2) Check the GS2150's display. If the display contains a weight or the message "—" go to step 3. If, however, the message "*OFF*" or "*-OFF*" is displayed, the electrical input from the load cells is outside the GS2150's calibration range and the GS2150 will be unable to calibrate the input. If either of these messages is displayed, set the digital setup parameter "*range*" to 1 (*range1*). This setting allows a load cell input of up to 30mV and this level is unlikely to be exceeded by the live load on the majority of weighing systems. If the GS2150 continues to display an off scale message after this setting is selected the load cells may have an electrical output which is beyond the GS2150's input specification, alternatively the installation or the GS2150 may be at fault - contact the factory for assistance.

3) Key *CAL* and then *SPAN*. The maximum capacity is displayed for 5 seconds. Span calibration may be stopped by keying *END CAL*. When 00000 is displayed, use *LEFT*, *UP* and *DOWN* to set the required calibrated weight.

4) Key *SPAN*. The GS2150 now automatically adjusts the display to show the required calibration weight. This process, which takes 5 seconds will end with the GS2150 resuming normal weighing. If gross weight is not already displayed select gross weight and check the calibrated value. If the GS2150 does not display the required gross weight repeat steps 3

and 4. If the required adjustment was outside the GS2150's range a message is displayed for 5 seconds. In this event the weighing installation should be reviewed.

Messages are :-

C HI or *OFF* The load cell input is too high to be spanned to the required weight.

C LO The load cell input is too low to be spanned to the required weight.

5) Remove the weight from the scale and check the zero return. If the weigher returns to zero calibration is completed. The front panel name plate may be installed and, if required, sealed. If the weigher does not return to zero it may be the result of creep or friction in the weighing installation. The installation should be carefully checked. Zero and Span Calibration should be carried out again.

4.8 Sealing the GS2150

The GS2150 name plate should be sealed in place to prevent unauthorized adjustment of the GS2150's digital setup and weight calibration settings. The holes in both the nameplate thumbscrews and the front panel may be used to seal the nameplate in place with a wire and lead seal.

4.9 Electrical Supply.

The GS2150 has been designed to operate properly on a normal mains electrical supply and incorporates modern techniques of mains supply filtration and dropped cycle protection.

There is a limit of mains supply noise, dropped cycles and voltage variations beyond which the GS2150 will cease to properly operate. In this event investigation will be required.

Likely causes of inaccurate batching and weighing include a poor electrical supply and inadequate attention to load cell and control cable shielding, ground paths, switched load spike suppression or routing of power cables in close proximity to load cell or control cables.

A poor mains supply problem may be rectified by a mains power conditioner or un-interruptible mains supply conditioner. Other problems will require a review of the entire installation.

5 BR1 BATTERY BACKED RAM.

The GS2150 can be factory fitted with a battery backed RAM, **OptionBR1**, to save settings which are otherwise lost during power failure.

The settings retained during power failure, together with the normal effect of power loss on these settings, are shown below:-

Zero Tracked Value.

The GS2150 normally clears the zero tracked gross value on power failure. With **OptionBR1** this value is saved. (**BR1** is not required to save the front panel key ZERO value. This value is always saved during power failure.)

Tare Weight.

The GS2150 normally clears the tare weight on power failure. With **OptionBR1** this value is saved.

Batch Counts.

The preset batch count value entered via the GS2150's keyboard is always saved during power failure. The actual batch counts are cleared to zero when power is applied. If the actual batch counts must be retained on power loss **OptionBR1** should be fitted.

Adjusted In-Flight Setting.

The In-Flight setting entered via the GS2150's keyboard is always saved during power failure. However, any adjustments made to this setting with the GS2150's "automatic In-Flight adjustment" feature are cleared on power failure unless **OptionBR1** is fitted, in which case they are retained.

Memorized Batched weight.

The GS2150 can be programmed to "memorize" the batched weight so that an accurate Final Weight can be batched with any number of "**HOLD**" and "**CONTINUE**" operations even while changing the gross weight (refilling a bin or changing a material bulk bag). With **OptionBR1** the memorized totals are retained on power loss, without **OptionBR1** these totals are cleared on power loss.

6 TOTALS/BR1 BATCHED TOTALS

The GS2150 can be factory fitted with a totals accumulator to accumulate batched weight and batch counts to a maximum of NINE digits.

This option, described throughout this manual, includes **BR1** described above. The option accumulates the selected net or gross batched weight and batch counts to battery backed memory which retains the totals in the event of power failure.

The totals can be recalled and noted at any time the GS2150 is not batching material.

7 TECHNICAL SPECIFICATION.

7.1 GS2150 Batch Controller.

INPUT

Sensitivity/Range :-	1.00uV/d to 75uV/d to a max. input of 30mV max range1. Display provides -4% to + 104% FS.
Linearity :-	-/+ 0.01% Full Scale.
Span Stability :-	-/+ 30ppm/
Zero Stability :-	+/-0.5microV/ +/- 30ppm/ of dead load offset.
Noise :-	1uV p-p RTI maximum.
Zero Adj. Range :-	- 1mV to + 30mV max range1
Excitation :-	10VDC Short Circuit Protected. Up to 8 x 350ohm Load Cells in parallel 230mA max.
Excitation Sensing :-	True differential remote sensing using a separate pair of wires.
Source Impedance :-	2kohm maximum.
Input Impedance :-	10Mohm minimum.
Analog Filter :-	Active 2Hz 2 Pole Low Pass.
Digital Filter :-	A/D averaging 1 to 16 samples.

CALIBRATION

Programming :-	Entirely via front panel keyboard.
Calibration :-	For ZERO; Press CAL ZERO for fully automatic dead load cancellation. For SPAN; Press CAL SPAN and enter required weight and press SPAN for automatic calibration.
Re-calibration :-	Recommended Re-calibration period 1 year.

FRONT PANEL

Weight Display :-	14mm high 7 segment High Intensity red LED display to a maximum of 199990 with minus (-) sign.
Annunciators :-	6 LED lamps identify displayed information.
Controls :-	Positive action tactile feedback key board behind tough water resistant membrane..

CONTROL OUTPUTS

4 Outputs :-	Fast and Slow Speed feeder control, Batch Complete and Zero band. Each is an optically isolated open collector capable of sinking 0.5Amp 5VDC to 45V DC from a user supplied power supply.
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CONTROL INPUTS

4 Inputs :-	Tare, Key Lock Stop and Start. Each is an optically isolated input having an internal 2.2kOhm current limiting resistor. The user's 5VDC to 24VDC power supply is sunk through the user's remote switch or device.
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GENERAL

Physical :-	All metal enamel finished desk and panel mounting enclosure including a panel mounting kit as standard.
Front :-	198mm wide x 96mm high
Body :-	184mm wide x 90mm high. Body length overall 149mm. For panel mounting DIN standard cut out 186mm wide x 92mm high. Body rear panel projection 137mm. Rear projection allowing space for the supplied power and load cell connector 176mm.
Unit weight :-	1.9kg. Shipping weight 3kg.
Environment :-	-10C to + 40C Operating; -15C to + 70C Storage; to 95%RH non condensing.
Power :-	100/110/117/200/220/240VAC -+ 10% 49 to 62Hz 15VA. (specify voltage at order)
Rear Panel :-	Power cable appliance receptacle; Fuse and fuse holder; 9 pin D male load cell connector and mating angled cable plug. 8 pin removable screw terminal block for control Input/Output.

OPTION BR1

BATTERY BACKED MEMORY. Factory fitted battery backed memory to save batch counts, tare weight, adjusted In-Flight setting, "memorized" batched weight and zero tracked value on power failure.

7.2 Ordering Guide.

GS2150	Batch Controller. Specify mains voltage.
OPTION BR1	Factory fitted battery backed ram.
TOTALS/BR1	Factory fitted battery backed ram and NINE digit totals accumulator for batched weights and batch counts.

8 WARRANTY

Definition.

In the following, Buyer shall mean the original purchaser of the equipment supplied by Gedge Systems. Seller shall mean Gedge Systems, the manufacturer of the equipment.

Extent.

This express warranty shall extend between Buyer and Seller only and shall cover all claims and costs during the warranty period between Buyer and Seller only, and, except for warranty of title, is in lieu of all other warranties, whether expressed or implied, including the implied warranties of fitness for a particular purpose and merchantability. Seller shall not be liable for any special, incidental or consequential damages resulting from a breach or alleged breach of this warranty.

Warrants.

The Seller warrants to the Buyer that the equipment shall be manufactured by good workmanship of materials free of defect and that such equipment when used and programmed in accordance with the Seller's instruction manuals shall perform in accordance with the equipment's specifications.

Repair/Replace/Exceptions.

The Seller shall repair or replace at its discretion, free of charge, any equipment or option which is returned to its facility within twelve (12) months of shipment to the Buyer, and which upon examination proves to be a manufacturing defect. The warranty does not apply to any equipment that has been :-

A. Repaired or modified by other than a duly authorized repair facility.

B. Programmed or adjusted not in accordance with the equipment's manual.

C. Mishandled, abused or which in the Seller's sole judgment has been exposed to an environment for which the equipment was not designed.

Shipping Costs.

This warranty applies to equipment received at the Seller's facility, freight prepaid by the Buyer, and does not include return freight to the Buyer's premises.

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